Programme

International Thyroid Eye Disease Society Teaching Course
Essentials for the practical understanding and management of TED
Thursday 23rd June 2016

International Thyroid Eye Disease Society Symposium
Latest information, research and experience from around the world
Friday 24th and Saturday 25th June 2016

Queen Elizabeth II Conference Centre, Westminster, in the Heart of London

Course Directors
Dr Jimmy Uddin
Consultant Ophthalmic Surgeon, Moorfields Eye Hospital, London
ITEDS President

Jennifer Sivak-Callcott
Secretary of Education for ITEDS

ITEDS Committee
Kenn Cahill, USA
Kelvin Chong, Hong Kong
Peter Dolman, Canada
Raymond Douglas, USA
Jonathan Dutton, USA
Steve Feldon, USA
Mike Kazim, USA
Don Kikkawa, USA
Mark Lucarelli, USA
Louise Mawn, USA
Suryasnata Rath, India
Lay Leng Seah, Singapore
Diego Strianese, Italy
Timothy Sullivan, Australia

www.aesculap-academia.co.uk

www.thyroideyedisease
Welcome

On behalf of the International Thyroid Disease Society Symposium (ITEDS), I am pleased to invite you to the 1 day Teaching Course and 2 day Symposium for the essentials for the practical understanding and management of TED along with the latest information, research and experience from around the world.

The programme includes both invited speakers with free papers and posters. Over 40 international multidisciplinary speakers including members from thyroid associations EUGOGO, NANOS and Orbit Society will take part.

A large part of the meeting includes free papers. We welcome the presentation of both 'in-progress' investigations or new study concepts along with completed research projects.

Themes

ITEDS Teaching Course
Interactive course with time to discuss and question experts
What is TED?
How do we best reliably assess TED?
What investigations and what does it mean?
What's the current best management options - Supportive, medical and surgical
Who, when and where should we refer patients?
What does the future hold for TED?
Practical stations with ophthalmologists, endocrinologists, orthoptists

ITEDS Symposium
Where is research leading us?
Which clinical approach to use to assess TED
What is important in systemic thyroid assessment?
World TED - Experiences from around the world
Paediatric TED - Are doing enough?
Latest updates from clinical trials
What is the best surgical approach to TED?

I hope that you are able to join us at the conference dinner on the evening of Friday 24th June – a great opportunity to network with potential colleagues and catch up with old friends. The dinner will be held at The Royal Horseguards, a venue rich with history and unbeatable views over the river Thames. This is a short 5 minute walk from the conference venue.

I hope that you have an enjoyable and informative time here with us in London.

Course Director
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TEDS Faculty
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Suryasnata Rath, India
Lay Leng Seah, Singapore
Jennifer Sivak-Callcott, USA
Diego Strianese, Italy
Timothy Sullivan, Australia
Jimmy Uddin, UK

Programme Advisors
Research:
Rebecca Bahn, USA
Daniel Ezra, UK
Marion Ludgate, UK
Terry Smith, USA

Endocrinology:
Colin Dayan, UK
Marius Stan, USA

Ophthalmology:
Kostas Boboridis, Greece
Anja Eckstein, Germany
Naresh Joshi, UK
William Katowitz, USA
Ilse Mombaerts, Belgium
Daniel Rootman, USA
Geoff Rose, UK
David Verity, UK

Invited Speakers
Research:
Maryse Bailly, UK
Paul Banga, UK
Utta Berchner-Pfannschmidt, Belgium
Susanne Neumann, USA
Stanton Newman, UK
Susanne Pitz, Germany

Endocrinology:
Assunta Albanese, UK
Gul Bano, UK
Paul Carroll, UK
George Kahaly, Germany
Claudio Marroccoli, Italy
Mario Salvi, Italy
Anthony Weetman, UK

Ophthalmology:
Gill Adams, UK
Lelio Baldeschi, Belgium/Italy
Michele Beaconsfield, UK
Richard Collin, UK
Omar Durrani, UK
Pierre Escalas, France
Sonal Farzavandi, Singapore
Robert Goldberg, USA
Chris Hammond, UK
Christoph Hintscich, Germany
Philippe Imbert, France
Su-Lang Liao, Taiwan
Chng Chiaw Ling, Singapore
Raman Malhotra, UK
Li Dong Mei, China
Perez Moreiras, Spain
Dan Morris, UK
Maarten Mourits, Holland
Mihind Naik, India
Mike Potts, UK
Francesco Quaranta Leoni, Italy
Rathie Rajendrum, UK
Peerooz Saeed, Holland
Pari Shams, UK
Sunny Shen, Singapore
Gangadhara Sundar, Singapore
Yasuhiro Takahashi, Japan
Michel Tazartes, France
Nikos Trakos, Greece
Galton Vasconcellos, Brazil
Wencan Wu, China
Morgan Yang, Singapore
Vivian Yin, Canada
Jin-Sook Yoon, South Korea
Hui-Fang Zhou, China

Other:
ENT: Abbad Toma, UK
Radiology: Katherine Miszkiel, UK
British Thyroid Foundation: Janice Hickey, UK
# International Thyroid Eye Disease Society Teaching Course

**Thursday 23rd June**  
One day course

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>07:30</td>
<td>Registration, refreshments and exhibition</td>
</tr>
<tr>
<td></td>
<td>Lectures - St James Room, 4th floor</td>
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<tr>
<td></td>
<td>Lunch, refreshments and exhibition - Westminster Room, 4th floor</td>
</tr>
</tbody>
</table>

| 08:30 | Welcome and introduction                                             |
|       | Jimmy Uddin                                                          |
|       | Organizational efforts: ITEDS, EUGOGO, Amsterdam Declaration         |

| 08:35 | Goals and objectives of the course                                  |
|       | Jennifer Sivak-Callcott                                             |

## Pathogenesis of Thyroid Eye Disease and clinical manifestations

| 08:40 | Systemic endocrine pathogenesis (part 1)                            |
|       | Rebecca Bahn                                                        |
| 08:50 | Orbital and ophthalmic pathogenesis (part 1)                        |
|       | Marion Ludgate                                                      |
| 09:00 | Clinical orbital and ocular anatomy                                 |
|       | Jonathan Dutton                                                     |
| 09:10 | Epidemiology and risk factors                                       |
|       | Marius Stan                                                         |
| 09:20 | Natural history, timeline and phases of Thyroid Eye Disease (part 1)|
|       | Mike Potts                                                         |
| 09:30 | Questions and discussion                                            |

## Clinical assessment of Thyroid Eye Disease and examination techniques and tools for evaluation

| 09.40 | The CAS score (Clinical Activity Score)                             |
|       | Maarten Mourits                                                    |
| 09.50 | Disease activity and severity scoring methods                       |
|       | Peter Dolman                                                       |
| 10.00 | ITEDS VISA classification                                           |
|       | Peter Dolman                                                       |
| 10.05 | Anterior segment examination (visual loss other than optic neuropathy)|
|       | Kenn Cahill                                                        |
| 10.15 | Globe position, proptosis and exophthalmometry                     |
|       | Jennifer Sivak-Callcott                                            |
| 10.25 | Eyelid retraction, position and dysfunction                         |
|       | Lay Leng Seah                                                      |
| 10.35 | Periocular facial changes                                           |
|       | Raymond Douglas                                                    |
| 10.45 | Extraocular motility and orthoptics                                  |
|       | Chris Timms                                                        |
| 10.55 | Posterior segment and optic nerve function/examination              |
|       | Steve Feldon                                                       |
| 11.05 | Questions and discussion                                            |

11.15 | Refreshments, exhibition and poster viewing                         |

## Tests and investigations

<p>| 11.45 | Biochemical tests in Thyroid Eye Disease                            |
|       | Paul Carroll                                                       |
| 11.55 | The euthyroid Thyroid Eye Disease                                   |
|       | Pei-fen Lin                                                        |
| 12.00 | Photography documentation                                           |
|       | Louise Mawn                                                        |
| 12.10 | Imaging (CT/MRI) for TED and differential diagnosis                |
|       | Katherine Miszkiel                                                  |</p>
<table>
<thead>
<tr>
<th>Time</th>
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<th>Speaker</th>
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<tbody>
<tr>
<td>12.10</td>
<td>Imaging (CT/MRI) for TED and differential diagnosis</td>
<td>Katherine Miszkiel</td>
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<tr>
<td>12.20</td>
<td>Cone beam computed tomography in Thyroid Eye Disease</td>
<td>Ben While</td>
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<tr>
<td>12.25</td>
<td>Thyroid-related Eye Disease in cancer patients</td>
<td>Bradley Thuro</td>
</tr>
<tr>
<td>12.35</td>
<td>Differential diagnosis - Orbital disorders concealed by TED (part 1)</td>
<td>Ilse Mombaerts</td>
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<tr>
<td>12.45</td>
<td>Questions and discussion</td>
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<tr>
<td>12.55</td>
<td>Lunch, exhibition and poster viewing</td>
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<tr>
<td></td>
<td>Early management of TED (1)</td>
<td>Chairs: Peter Dolman,</td>
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<tr>
<td></td>
<td></td>
<td>Marius Stan</td>
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<tr>
<td>13.45</td>
<td>Overview of early management and optimization of risk factors (part 1)</td>
<td>Tim Sullivan</td>
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<tr>
<td>13.55</td>
<td>Smoking is a risk factor for TED - Control of smoking</td>
<td>Sally Webber</td>
</tr>
<tr>
<td>14.00</td>
<td>Basic principles of treating thyrotoxicosis</td>
<td>Anthony Weetman</td>
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<tr>
<td>14.15</td>
<td>Over the counter medical management</td>
<td>Steve Feldon</td>
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<tr>
<td>14.25</td>
<td>Ophthalmic exposure management</td>
<td>Kenn Cahill</td>
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<tr>
<td>14.35</td>
<td>Minimally invasive comfort measures in active disease</td>
<td>Daniel Rootman</td>
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<tr>
<td>14.40</td>
<td>Questions and discussion</td>
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<tr>
<td></td>
<td>Early management of TED (2)</td>
<td>Chairs: Don Kikkawa,</td>
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<td></td>
<td></td>
<td>Rebecca Bahn</td>
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<tr>
<td>14.50</td>
<td>Steroid treatment</td>
<td>Pari Shams</td>
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<tr>
<td>15.05</td>
<td>Steroid-sparing immunosuppression</td>
<td>Genevieve Larkin</td>
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<tr>
<td>15.10</td>
<td>Radiotherapy</td>
<td>Mike Kazim</td>
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<tr>
<td>15.15</td>
<td>Acute surgical intervention</td>
<td>Jimmy Uddin</td>
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<tr>
<td>15.20</td>
<td>New treatments (rituximab, IFR antagonists, IL6 blockers etc.)</td>
<td>Jonathan Dutton</td>
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<tr>
<td>15.30</td>
<td>Questions and discussion</td>
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<tr>
<td>15.40</td>
<td>Refreshments, exhibition and poster viewing</td>
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<tr>
<td></td>
<td>Surgery for TED</td>
<td>Chairs: Lay Leng Seah,</td>
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<td></td>
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<td>Louise Mawn</td>
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<td>16.00</td>
<td>Surgical options- Overview (rationale and sequence)</td>
<td>Don Kikkawa</td>
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<tr>
<td>16.10</td>
<td>Lateral wall orbital decompression</td>
<td>Don Kikkawa</td>
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<tr>
<td>16.15</td>
<td>Medial wall/floor orbital decompression</td>
<td>David Verity</td>
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</tbody>
</table>
### International Thyroid Eye Disease Society Teaching Course

**Thursday 23rd June**  
One day course

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<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>16.20</td>
<td>Endoscopic approach to orbital decompression</td>
<td>Kelvin Chong</td>
</tr>
<tr>
<td>16.25</td>
<td>Fat decompression</td>
<td>Mike Kazim</td>
</tr>
<tr>
<td>16.30</td>
<td>Eye muscle surgery</td>
<td>Chris Hammond</td>
</tr>
<tr>
<td>16.35</td>
<td>Questions and discussion</td>
<td>Lay Leng Seah</td>
</tr>
<tr>
<td>16.45</td>
<td>Hyaluronic acid to improve QoL in TED patients - Easy, safe, accurate and reversible choice</td>
<td>Ignacio Genol</td>
</tr>
<tr>
<td>16.50</td>
<td>Upper eyelid lowering surgery</td>
<td>Christoph Hintschich</td>
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<tr>
<td>16.55</td>
<td>Lower eyelid raising surgery</td>
<td>Diego Strianese</td>
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<tr>
<td>17.00</td>
<td>Questions and discussion</td>
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#### Quality of Life

**Quality of life**  
**Chairs**: Mike Kazim, Diego Strianese

<table>
<thead>
<tr>
<th>Time</th>
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<th>Speaker(s)</th>
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<tbody>
<tr>
<td>17.10</td>
<td>An aesthetic approach to surgery to enhance quality of life</td>
<td>Robert Goldberg</td>
</tr>
<tr>
<td>17.20</td>
<td>Patients’ quality of life</td>
<td>Daniel Ezra</td>
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<tr>
<td>17.25</td>
<td>Knowledge of Thyroid Eye Disease- Identification of 'gaps' in understanding in Graves' Disease patients with and without orbitopathy</td>
<td>Matthew Edmunds</td>
</tr>
<tr>
<td>17.30</td>
<td>Patient’s perspective</td>
<td>Janis Hickey</td>
</tr>
<tr>
<td>17.40</td>
<td>Referral pathways – Multidisciplinary management – Who, when and where to refer?</td>
<td>Colin Dayan</td>
</tr>
<tr>
<td>17.50</td>
<td>Questions and discussion</td>
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<tr>
<td>18.00</td>
<td>Closing remarks</td>
<td>Jennifer Sivak-Callcott, Jimmy Uddin</td>
</tr>
<tr>
<td>18.05</td>
<td>Course close</td>
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</table>

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<thead>
<tr>
<th>Time</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.10</td>
<td>Please visit the Westminster room on the 4th floor for a drinks reception to thank all attendees of the ITEDS teaching course and welcome those attending the ITEDS symposium. This is a great opportunity to view posters and catch up with old friends.</td>
</tr>
<tr>
<td>19.00</td>
<td>Drinks reception close</td>
</tr>
</tbody>
</table>
International Thyroid Eye Disease Society Symposium
Friday 24th June
Two day symposium

07.00  Registration, refreshments and exhibition

Lectures – Mountbatten Room, 6th floor
Lunch, refreshments and exhibition – Cambridge Room, 5th floor

08.00  Welcome and introduction
ITEDS history and aims
Jimmy Uddin

Pathogenesis of TED (1)  Chairs: Jonathan Dutton, Daniel Ezra

08.10  Pathogenesis of TED - An orbital perspective (part 2)
Marion Ludgate

08.18  Endocrine molecular mechanisms in the pathogenesis TED (part 2)
Rebecca Bahn

08.26  Animal models for TED - How far have we come?
Paul Banga

08.34  In Vitro models for TED - What is available?
Maryse Bailly

08.42  In vivo ocular biomechanical compliance in Thyroid Eye Disease
Richard Hart

08.48  Questions and discussion

09.00  Molecular mechanisms in TED and the role of insulin-like growth factor-1 Receptor (Igf-1r)
Terry Smith

09.08  Anti IL6 receptor antibody (Tocilizumab) influence on inflammatory interleukins levels in peripheral blood mononuclear cells cultures of patients with active thyroid eye disease - In vitro study
Santiago Ortiz-Perez

09.13  Platelet-derived growth factor in the pathogenesis of Graves’ ophthalmopathy
Wim Dik

09.21  Autophagy is involved in the pathogenesis of Thyroid Eye Disease
Jin-Sook Yoon

09.30  Case series of alemtuzumab (Campath-1H) induced Graves’ orbitopathy
Rachna Murthy

09.33  Questions and discussion

Pathogenesis of TED (2)  Chairs: Rebecca Bahn, Jennifer Sivak-Callcott

09.43  Proteomics study on orbital fat in thyroid orbitopathy
Chng Chiaw Ling

09.51  The tear cytokine profile of patients with active Graves’ orbitopathy - Applications for the future
Morgan Yang

09.59  Biomarkers and the microbiome - Indigo study
Marion Ludgate

10.07  Orbital stems cells in Thyroid Eye Disease
Sara Wester

10.12  Small molecule TSHr antagonists
Susanne Neumann

10.20  Hif signaling pathways in TED
Utta Berchner-Pfannschmidt

10.28  Questions and discussion

10.40  Refreshments, exhibition and poster viewing
### Clinical assessment of TED (1)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.00</td>
<td>CAS score - 30 years on</td>
<td>Maarten Mourits</td>
</tr>
<tr>
<td>11.08</td>
<td>ITEDS/Visa - Pros and cons (part 2)</td>
<td>Peter Dolman</td>
</tr>
<tr>
<td>11.16</td>
<td>Advantages and disadvantages with EUGOGO clinical assessment</td>
<td>Susanne Pitz</td>
</tr>
<tr>
<td>11.24</td>
<td>Pitfalls in assessment of TED</td>
<td>Daniel Morris</td>
</tr>
<tr>
<td>11.32</td>
<td>Clinical staging and grading in Thyroid Eye Disease</td>
<td>Daniel Rootman</td>
</tr>
<tr>
<td>11.40</td>
<td>CAS - Pros and cons and the future? Discussion</td>
<td>Kostas Boboridis</td>
</tr>
<tr>
<td>11.48</td>
<td>Questions and discussion</td>
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### Clinical assessment of TED (2)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chairs</th>
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</thead>
<tbody>
<tr>
<td>12.00</td>
<td>Conjunctival venous flow reversal - A new sign for detecting raised venous pressure and localising space occupation in the orbit</td>
<td>Paul Meyer</td>
</tr>
<tr>
<td>12.08</td>
<td>Inflammatory reliability study (ITEDS)</td>
<td>Louise Mawn</td>
</tr>
<tr>
<td>12.16</td>
<td>Exophthalmometry</td>
<td>Jennifer Sivak-Callcott</td>
</tr>
<tr>
<td>12.22</td>
<td>Patterns of visual field changes in Thyroid Eye Disease compressive optic neuropathy</td>
<td>Suzanne Freitag</td>
</tr>
<tr>
<td>12.28</td>
<td>Measuring optic neuropathy</td>
<td>Ashley Campbell</td>
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<tr>
<td>12.34</td>
<td>Questions and discussion</td>
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### Stand alone talks

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<th>Chairs</th>
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<tr>
<td>12.45</td>
<td>Quality of life measures</td>
<td>Stanton Newman</td>
</tr>
<tr>
<td>12.53</td>
<td>Questions and discussion</td>
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<tr>
<td>13.00</td>
<td>Lunch, exhibition and poster viewing</td>
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### Imaging and photography

<table>
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<th>Chairs</th>
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<tr>
<td>14.00</td>
<td>Photographic inflammation study</td>
<td>Peter Dolman</td>
</tr>
<tr>
<td>14.06</td>
<td>Application of 3D volumetric assessment in TED</td>
<td>Daniel Ezra</td>
</tr>
<tr>
<td>14.14</td>
<td>Digital infrared thermal imaging for early detection and disease monitoring of Thyroid Eye Disease</td>
<td>Matthew Edmunds</td>
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<td>Page 20</td>
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<tr>
<td>14.22</td>
<td>Radiology - When is it really useful? (part 2)</td>
<td>Katherine Miszkiel</td>
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<tr>
<td>14.30</td>
<td>Quantitative T2 mapping and fat fraction measurements of extra-ocular muscles in Thyroid Eye Disease</td>
<td>Tilak Das</td>
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<td>Page 21</td>
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<tr>
<td>14.35</td>
<td>Can imaging predict disease type</td>
<td>Louise Mawn</td>
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<tr>
<td>14.40</td>
<td>Questions and discussion</td>
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</tbody>
</table>
Thyroid dysfunction

14.50 Treating hyperthyroidism in TED including radioiodine (part 2) Anthony Weetman
14.58 Best method for endocrine control Colin Dayan
15.06 Hypothyroidism in TED Gul Bano
15.14 Questions and discussion
15.20 Endocrine risk factors Rebecca Bahn
15.28 Tsh receptor antibody tests in TED and Graves' disease (part 2) Marius Stan
15.36 Relevance of Tsh-R-Ab assays In TED George Kahaly
15.44 Questions and discussion

15.50 Refreshments, exhibition and poster viewing

Paediatric TED – Are we doing enough?

16.10 Paediatric TED William Katowitz
16.18 Endocrine factors in paediatric TED Assunta Albanese
16.26 Paediatric TED - When should we intervene? Jimmy Uddin
16.31 Questions and discussion

Euthyroid TED and differential diagnosis

16.36 Differential diagnosis – Orbital disorders masquerading as TED (part 2) Ilse Mombaerts
16.44 Reactivation of TED - When is not TED? When to biopsy? David Verity
16.52 Questions and discussion

TED – Experiences from around the world

16.56 Epidemiological characteristics of 726 patients with dysthyroid orbitopathy followed between 1995 and 2013 in a multidisciplinary thyroid-eye consultation in Toulouse France Philippe Imbert
17.02 Visa classification - Trend in the Indian subcontinent Suryasnata Rath
17.10 Presentation of TED in the Indian population Milind Naik
17.18 Ethnic difference in clinical presentation of Thyroid Eye Disease Lay Leng Seah
17.26 Phenotypes in TED Jimmy Uddin
17.31 Questions and discussion
17.40 Day one close
### International Thyroid Eye Disease Society Symposium

Saturday 25th June
Two day symposium

**07.30** Registration, exhibition and poster viewing

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<th>Lectures - Mountbatten Room, 6th floor</th>
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<td>Lunch, refreshments and exhibition - Cambridge Room, 5th floor</td>
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#### Management of early/active/progressive TED

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<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
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<tr>
<td>08.00</td>
<td>Overview - Treatment of early/active/progressive TED (Part 2)</td>
<td>Timothy Sullivan</td>
</tr>
<tr>
<td>08.08</td>
<td>Strategies and drugs to prevent TED</td>
<td>Steve Feldon</td>
</tr>
<tr>
<td>08.16</td>
<td>Why selenium works in treatment and possible prevention of TED?</td>
<td>Claudio Marcocci</td>
</tr>
<tr>
<td>08.24</td>
<td>Case - Mild disease</td>
<td>Kenn Cahill</td>
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<tr>
<td>08.32</td>
<td>Questions and discussion</td>
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<tr>
<td>08.40</td>
<td>Glucocorticoids, dose and duration strategies in the treatment of TED</td>
<td>Claudio Marcocci</td>
</tr>
<tr>
<td>08.48</td>
<td>Intravenous steroids in Thyroid Eye Disease</td>
<td>Gangadhara Sundar</td>
</tr>
<tr>
<td>08.56</td>
<td>The management of Thyroid Eye Disease by immunomodulation - The Cambridge regime</td>
<td>Nima Ghadiri</td>
</tr>
<tr>
<td>09.02</td>
<td>Questions and discussion</td>
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#### Management of early/active/progressive TED- “second-line” immunosuppression

<table>
<thead>
<tr>
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<tr>
<td>09.10</td>
<td>Role of second line immunosuppression in active TED - Why, what and how long? (Part 2)</td>
<td>Mike Potts</td>
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<tr>
<td>09.18</td>
<td>Mycophenolate sodium in Graves' orbitopathy (Mingo) – Update</td>
<td>George Kahaly</td>
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<td>09.26</td>
<td>Efficacy of combined orbital radiation and systemic steroids in the management of Graves' orbitopathy</td>
<td>Yuri Seo</td>
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<td>09.34</td>
<td>CIRTED (Combined Immunosuppression and Radiotherapy In TED)</td>
<td>Rathie Rajendrum</td>
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<td>09.42</td>
<td>Radiotherapy for treatment of optic neuropathy</td>
<td>Mike Kazim</td>
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<td>09.48</td>
<td>Case - Mod/severe disease</td>
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<td>09.54</td>
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#### Management of active/progressive TED- “Biologicals”

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<tr>
<td>10.20</td>
<td>Rituximab - An effective drug for active TED - It works!</td>
<td>Mario Salvi</td>
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<td>10.28</td>
<td>Rituximab - Is it effective? - Does it work?</td>
<td>Marius Stan</td>
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<td>10.45</td>
<td>Insulin-like growth factor – 1 receptor (Igf-1r) antagonist antibody - Trial update</td>
<td>Raymond Douglas</td>
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<td>10.53</td>
<td>Tocilizumab – How effective is it? - Trial update</td>
<td>Jose Perez Moreiras</td>
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<td>11.01</td>
<td>Risks and side-effects of immunosuppression- Is it too risky?</td>
<td>Diego Strianese</td>
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### Management of progressive TED

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<td>Early decompression for active TED</td>
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<td>Graves orbitopathy with optic neuropathy - Mechanisms and the management</td>
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<td>Severe case discussion - Panel discussion</td>
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<td>11.40</td>
<td>Case - Severe/resistant disease</td>
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<td>11.48</td>
<td>Questions and discussion</td>
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Chairs: Lay Leng Seah, Geoff Rose

### Studies and outcome measures

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<tr>
<td>12.00</td>
<td>Reading center for TED-related multicenter clinical trials</td>
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<td>12.06</td>
<td>Biobanks</td>
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<tr>
<td>12.12</td>
<td>Questions and discussion</td>
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<tr>
<td>12.20</td>
<td>How to plan the next ‘TED clinical trial’ with a discussion on primary and secondary study outcomes and a discussion on study propositions</td>
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<tr>
<td></td>
<td>Radiotherapy studies in Thyroid Eye Disease</td>
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<td>12.40</td>
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Chairs: Marius Stan, Raymond Douglas

### Surgical treatment/techniques for TED (1)

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<th>Time</th>
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<tbody>
<tr>
<td>13.45</td>
<td>Surgery for TED – Introduction</td>
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<td>13.50</td>
<td>Orbital anatomy - Important surgical landmarks in orbital decompression</td>
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<td>13.58</td>
<td>Rethinking the orbital strut in inferomedial orbital decompression</td>
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<td>14.04</td>
<td>Endoscopic fat decompression for Thyroid Eye Disease</td>
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<td>14.12</td>
<td>The role of fat excision with or without bone removal in orbital decompression for patients with Thyroid Eye Disease</td>
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<td>14.20</td>
<td>The greatest experience of bony orbital decompression in TED in Russian Federation</td>
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<td>14.26</td>
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<td>14.35</td>
<td>Decompression – Lateral wall- External approach - Why I do it?</td>
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<tr>
<td>14.43</td>
<td>Decompression – Lateral wall- Internal approach - Why I do it?</td>
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<td>14.51</td>
<td>Posterior orbital movement after deep lateral and medial balanced decompression for thyroid-related orbitopathy</td>
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<td>14.56</td>
<td>Questions and discussion</td>
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Chairs: Don Kikkawa, Omar Durrani, Mike Kazim
**Surgical treatment/techniques for TED (2)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>15:00</td>
<td>Medial wall and internal inferior wall decompression through a superior eyelid crease approach – Personal technique</td>
<td>Jose Perez Moreiras</td>
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<tr>
<td>15:05</td>
<td>Decompression - Medial wall – Retrocaruncular approach - ‘A 20 minute procedure’</td>
<td>Geoff Rose</td>
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<tr>
<td>15:10</td>
<td>Decompression - Medial wall endoscopic – Takes a bit longer than 20 minutes?</td>
<td>Abbad Toma</td>
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<tr>
<td>15:15</td>
<td>Decompression - Medial wall endoscopic – Advantages of endoscopic approach</td>
<td>Kelvin Chong</td>
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<tr>
<td>15:20</td>
<td>Endoscopic versus external medial orbital wall decompression in Thyroid Eye Disease – A prospective, randomised controlled pilot study</td>
<td>Tom Hardy</td>
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<tr>
<td>15:25</td>
<td>Endonavigation system assisted orbital decompression for Thyroid Eye Disease</td>
<td>Hui-Fang Zhou</td>
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<tr>
<td>15:30</td>
<td>Questions and discussion</td>
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**15.40** Refreshments, exhibition and poster viewing

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**Surgical treatment/techniques for TED (3)**

<table>
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<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>15:55</td>
<td>Is it possible to reduce the time of a complete surgical management of thyroid orbitopathy with one step procedures?</td>
<td>Michel Tazartes</td>
</tr>
<tr>
<td>16:00</td>
<td>Efficacy of lateral orbital rim decompression in patients with prior rim-sparing three-wall orbital decompression</td>
<td>Bradford Lee</td>
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<tr>
<td>16:03</td>
<td>Challenges in orbital decompression in South East Asia</td>
<td>Sunny Shen</td>
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<tr>
<td>16:11</td>
<td>Decompression – Complications</td>
<td>Vivian Yin</td>
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<tr>
<td>16:17</td>
<td>Questions and discussion</td>
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**Surgical treatment/techniques for TED (4)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>16:25</td>
<td>Understanding strabismus in TED – Options</td>
<td>Gill Adams</td>
</tr>
<tr>
<td>16:33</td>
<td>How does orbital surgery affect strabismus in TED ?</td>
<td>Lelio Baldeschi</td>
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<tr>
<td>16:41</td>
<td>Rectus muscle resection to correct vertical ocular misalignment in Thyroid Eye Disease</td>
<td>Andre Grixti</td>
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<tr>
<td>16:44</td>
<td>Strabismus surgery in Thyroid Eye Disease – Are we playing by a new set of rules</td>
<td>Sonal Farzavandi</td>
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<tr>
<td>16:52</td>
<td>Vertical eye muscle surgery – Options? Inferior, superior rectus or better the obliques or all together?</td>
<td>Anja Eckstein</td>
</tr>
<tr>
<td>17:00</td>
<td>Challenges to obtain the best surgical result in thyroid related strabismus</td>
<td>Galton Vasconcelos</td>
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<tr>
<td>17:08</td>
<td>Combined and complex situations – Questions and discussion</td>
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Eyelid and additional strategies for surgery in TED

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>17.15</td>
<td>Surgery for correction of eyelid retraction in Thyroid Eye Disease</td>
<td>Li Dong Mei</td>
</tr>
<tr>
<td>17.18</td>
<td>Fat transposition to keep the lid crease in the right place in case of levator recession</td>
<td>Pierre Escalas</td>
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<tr>
<td>17.21</td>
<td>Seamless simultaneous surgery for upper and lower eyelid retraction in TED</td>
<td>Suzanne Freitag</td>
</tr>
<tr>
<td>17.29</td>
<td>Decompression plus - Role of adjunctive procedures</td>
<td>Raman Malhotra</td>
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<tr>
<td>17.37</td>
<td>Aesthetic approaches to TED surgery - Blepharoplasty and the brow</td>
<td>Naresh Joshi</td>
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<tr>
<td>17.50</td>
<td>Questions and discussion</td>
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<tr>
<td>17.55</td>
<td>Closing remarks</td>
<td>Jimmy Uddin</td>
</tr>
<tr>
<td>18.00</td>
<td>Symposium close</td>
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</tbody>
</table>
The euthyroid Thyroid Eye Disease

P. Lin, P. Brittain
Sussex Eye Hospital, Brighton and Sussex University Hospital, Eastern Road, Brighton, East Sussex, BN2 5BF, United Kingdom

Aim
1. Demonstrate the importance of thyroid auto-antibody tests in patients with suspected Thyroid Eye Disease despite previous normal thyroid function tests.
2. Demonstrate the benefit of early systemic high dose steroid treatment in patients with high thyroid auto-antibody levels.

Method
Case report.

Result
3 female patients presented with signs and symptoms of active Thyroid Eye Disease, with clinical activity scores ranging from 2-4/8. None had systemic signs or symptoms of hyperthyroidism, and TFT in the community were all normal. However, all three showed exceptionally raised Thyroid peroxidase antibody ranging from 119 to 350iu/ml (normal range < 35iu/ml). MRI demonstrated active inflammation in the orbit consistent with Thyroid Eye Disease. All three patients were treated with high dose IV Methylprednisolone. All responded well with resolution of Thyroid Eye Disease symptoms with CAS score of 0-1/8 with minimal side effects. One patient reported resolution of small joint inflammation.

Conclusion
Routine thyroid function tests performed in the community does not include auto-antibodies. Normal thyroid function tests result does not exclude Thyroid Eye Disease. Therefore patients with clinical signs of Thyroid Eye Disease warrant further investigation to include thyroid auto-antibodies and imaging. Early high dose IV steroid treatment should be considered as it is well tolerated and effective.

Cone beam computed tomography in Thyroid Eye Disease

B. While, S. S Salvi
Ophthalmology, Sheffield Teaching Hospitals NHS Trust, Royal Hallamshire Hospital, Glossop Road, Sheffield, S10 2JF, United Kingdom

Aim
To demonstrate the usefulness of cone beam computed tomography (CBCT) in the investigation of patients with Thyroid Eye Disease.

Method
10 patients underwent CBCT prior to orbital decompression surgery. The images were utilised in pre-operative planning prior to orbital decompression surgery.

Result
In all cases the image field size and quality were easily sufficient to assess the boney and soft tissue anatomy of the orbits. Successful surgery was carried out in all 10 cases following pre-operative planning with the aid of CBCT.

Conclusion
Computed tomography has long been an important tool in the assessment and pre-operative planning of patients with Thyroid Eye Disease. In addition to giving details of the bony anatomy of the orbit CBCT provides adequate information on the soft tissue anatomy including the extraocular muscles and orbital fat. CBCT has been used widely in maxillofacial imaging for more than 15 years. There are many CBCT units capable of providing submillimetre resolution images in formats that enable volumetric visualization. This study shows that for orbital imaging CBCT offers comparable image quality with lower overall radiation doses than standard CT imaging making it a good option for patients with Thyroid Eye Disease.
Thyroid-related Eye Disease in cancer patients

B. A. Thuro MD1, M. E. Cabanillas MD1, N. L. Busaidy MD, FACP, FACE1, R. Dadu MD2, C. Jimenez, MD2, P. H. Graham MD2, B. Esmaeli MD, FACS3

1Department of Endocrine Neoplasia and Hormonal Disorders, Division of Internal Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX, United States.
2Department of Surgical Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, United States

Aim
The coexistence of Graves’ disease in patients with thyroid carcinoma has been reported in the literature. Thyroid carcinoma has been reported to have a frequency ranging from 1.3 to 3.9% in patients with Graves’ disease, compared to 1-2% amongst the general population. What is less well described is the spectrum of thyroid-related eye disease (TED) in patients with thyroid carcinoma. Furthermore, cancer patients with non-thyroid eye disease can develop TED as a result of cancer therapy. The aim of this review is to review the clinical spectrum of TED in patients with thyroid carcinoma, and to further report the development of TED as a result of cancer treatment in non-thyroid cancer patients.

Method
Patients who were identified as having a diagnosis of cancer and TED, and were treated at our tertiary cancer center from June 1st 2008, through January 15th 2016 were retrospectively reviewed. Information about age, gender, ethnicity, date of onset of Thyroid Eye Disease, date and type of cancer diagnosis, treatment for cancer, results of thyroid function tests and imaging evaluation, and smoking history were recorded.

Result
Eleven cancer patients were identified during the study period with a diagnosis of TED. Five had a diagnosis of thyroid carcinoma and TED; in 2 patients, the diagnosis of TED preceded thyroid carcinoma (one by 4 years and the other by 5 months), in 2 patients the diagnosis of TED coincident with the diagnosis of thyroid carcinoma. In one patient, thyroid carcinoma preceded TED by 2 years. Of the five patients, four patients had thyroid function labs available for review which demonstrated hyperthyroidism in 3, and euthyroidism in one. Four of the 5 patients had papillary thyroid carcinoma, and one had Hürthle cell carcinoma. One of the patients with papillary thyroid carcinoma had this diagnosis in the setting of struma ovarii, diagnosed from a retroperitoneal mass without a primary carcinoma identified in the total thyroidectomy specimen. Manifestations of TED in these 5 patients included periorbital edema and diplopia associated with extraocular motility restriction in 4 patients, exophthalmos in 3 patients, lid retraction in 2 patients. Computed tomography was available in 2 patients; one patient demonstrated moderate enlargement of extraocular muscles; the other demonstrated soft tissue thickening but no enlargement of the extraocular muscles. Six cancer patients were identified with a history of non-thyroid cancer who had TED; 2 were treated with immunotherapy for their cancer, one developed Graves’ disease 3 years after an autologous bone marrow transplant for POEMS syndrome, one developed Graves’ disease immediately after restarting carboplatin for non-small cell lung carcinoma, one developed Hashimoto’s thyroiditis 2 years after treatment of stage III follicular lymphoma with chemotherapy, and one developed Graves’ disease 3 years after stage II marginal zone lymphoma in the thyroid gland was successfully treated with ibritumomab tiuxetan. In the two patients treated with immunotherapy, one patient had metastatic urothelial carcinoma treated with nivolumab and ipilimumab, and the second patient had metastatic melanoma treated with tremelimumab; both demonstrated relatively rapid onset of pain and double vision, which quickly resolved with intravenous steroids. Both patients died shortly after cessation of immunotherapy due to metastatic disease. See Table 1 for a list of all 11 patients.

Patient | Primary Cancer | TED Symptoms/Signs | Treatment |
--- | --- | --- | --- |
1 | Papillary thyroid carcinoma | Diplopia, pain, edema | Methimazole followed by total thyroidectomy |
2 | Papillary carcinoma in struma ovarii | Proptosis | Methimazole followed by total thyroidectomy and radioactive iodine |
3 | Hürthle cell carcinoma | Diplopia, proptosis, edema | Methimazole, IV steroids |
4 | Papillary thyroid carcinoma | Eyelid retraction, diplopia, edema | Total thyroidectomy |
5 | Papillary thyroid carcinoma | Eyelid retraction, diplopia, proptosis, pain, edema, thyrotoxicosis | Radioactive iodine followed by total |
6 | POEMS syndrome treated with autologous stem cell transplant | Proptosis | Methimazole followed by total thyroidectomy |
7 | Follicular lymphoma treated with cytotoxic chemotherapy and rituximab | Exposure keratopathy | Methimazole followed by total thyroidectomy |
8 | Non-small cell lung carcinoma treated with carboplatin and pemetrexed | Lagophthalmos | Methimazole |
9 | Marginal zone lymphoma treated with ibritumomab tiuxetan | Eyelid retraction, proptosis, edema | Unknown – follow up obtained elsewhere |
10 | Metastatic urothelial carcinoma treated with nivolumab and ipilimumab | Diplopia, pain | IV steroids |
11 | Metastatic Melanoma treated with tremelimumab | Edema | IV and oral steroids |

Conclusion
Thyroid-related eye disease is an autoimmune finding of interest in patients with thyroid carcinoma. It can also occur in association with cancer therapy, particularly in association with immune-based therapies, and in patients without a diagnosis of thyroid carcinoma. Ophthalmologists should be aware of the association between the use of immune check point inhibitors and Graves-type ophthalmopathy.

References
Hyaluronic acid to improve QoL in TED patients – Easy, safe, accurate and reversible choice

I. Genol, B. Stoica, N. Toledano
Oculoplastic Surgery, Fuenlabrada University Hospital, Camino del Molino 2, Madrid, 28942

Aim
Upper eyelid retraction is the most frequent feature affecting QoL in TED patients. We were looking for a method to improve this QoL and tried with non animal stabilized hyaluronic acid injections as an easy, quick, safe, accurate, comfortable and reversible procedure.

Method
21 consecutive patients (in active or chronic phase) were treated at first visit in an Oculoplastic Department. No need for local anaesthesia. Hyaluronic acid injections through skin-orbicularis. Quality of life questionnaires from ITEDS and EUGOGO were filled before and after treatment. Pre and post treatment pictures were analyzed by independent observers with a medium follow up of 15 months.

Result
Significant improvement in physical appearance and QoL in every single patient. 20% needed more than a single session, whitout any complications. Only 1 patient wanted to be treated with hyaluronidase after noticed the correct effect of the hyaluronic acid and looking for a more longlasting procedure. Haven't finished the follow up period we have seen results lasting more than 2 years.

Conclusion
It is easy to perform, quite accurate and safe procedure to improve quality of life in TED patients, no matter if they are in active or in a chronic phase. Even if patient or physician doesn’t like the effect it is reversible in few hours.
Further studies need to be done to establish how long does it last and if this technique could modify the natural history of the disease.

Knowledge of Thyroid Eye Disease – Identification of ‘gaps’ in understanding in Graves’ disease patients with and without orbitopathy

M. Edmunds, H. Saedon, F. Mellington, K. Boelaert
University Hospitals Birmingham NHS Foundation Trust, Mindelsohn Way, Birmingham, B15 2WB, United Kingdom

Aim
Patients with Thyroid Eye Disease (TED) may have delayed presentation to ophthalmologists, when debilitating and deforming orbital and periocular inflammatory changes have already occurred. The reasons for this are multifactorial, but poor knowledge of TED in Graves’ Disease (GD) patients may be contributory. We assessed and compared knowledge of TED in those with established TED, GD without any ophthalmic manifestations and control subjects.

Method
A validated, anonymised questionnaire, with 20 knowledge-based questions, was completed by 100 GD patients, 100 TED patients and 100 age- and sex-matched controls (with no history of thyroid disease or TED). Demographic data including highest level of educational attainment and first language were requested, as well as details of disease duration and clinic follow-up. Residence post-code was used to determine an Index of Multiple Deprivation (IMD 2010) score. Statistical analysis was undertaken with Mann–Whitney U test.

Result
There was no statistically significant difference in median knowledge scores (out of 20) of GD (13.25, range 9–18) and TED (13.75, range 9–18) patients. However, both of these groups had significantly higher scores than controls (10.5, range 6–16) [p<0.01]. Multivariable analysis determined that there was no independent variable associated with lower knowledge score. Most patients knew that TED involved expansion of orbital tissues (94%) and that TED is not an infection (95%), but more than half (55%) were unaware that TED may develop in the absence of hyperthyroidism and 27% did not know of the association between cigarette smoking and TED.

Conclusion
Patients with established TED had equivalent levels of knowledge of TED to GD patients without ophthalmic manifestations. While both patient groups had greater knowledge than controls, each had significant misconceptions and misunderstandings regarding a number of aspects of TED diagnosis, management and treatment. Educational materials should be targeted to address these knowledge ‘gaps’.
Orbital stems cells in Thyroid Eye Disease

S. Wester
Department of Ophthalmology, University of Miami, 900 NW 17th St, Miami, Florida, United States

Aim
To evaluate the intrinsic genetic and cellular differences in the Mesenchymal derived Stem Cell (MDSC) populations derived from Thyroid Eye Disease (TED) patients and controls.

Method
MDSC were obtained and isolated from adipose orbital tissue from TED patients and normal controls. A meta analysis of available microarray data from orbital tissue from TED patients and normal controls was performed. A comparative analysis of gene expression differences of MDSC and orbital tissue was performed.

Result
MDSC were isolated from orbital adipose tissue of TAO and control, with increased staining along differentiation cell lines in TAO. The gene expression analysis of MDSC derived from orbital tissue of TAO patients and controls revealed differences in regulatory and differentiation pathways, with particularly increased expression of IRK1 and HOXB2 and other transcription factors. Many of the genetic alterations observed were at sites that are targets for epigenetic modifications.

Anti IL6 receptor antibody (Tocilizumab) influence on inflammatory interleukins levels in peripheral blood mononuclear cells cultures of patients with active Thyroid Eye Disease – In vitro study

S. Ortiz-Perez, A. Leszczynska, E. Fernández, B. Molins, A. Adán
Institut Clínic d'Oftalmologia. Hospital Clinic. Barcelona. Spain

Aim
The purpose of the study was to compare the IL6, IL17, IL4, INF gamma, sIL6r levels in peripheral blood mononuclear cells (PBMCs) cultures of patients diagnosed with active Thyroid Eye Disease (TED) and healthy controls. We also aimed to evaluate the influence of dexamethasone and tocilizumab on interleukins levels produced by patients’ PBMCs and to correlate them with the clinical activity score.

Method
A prospective, controlled, proof of concept test, on a cohort of the patients diagnosed with Thyroid Eye Disease. Peripheral blood mononuclear cells from patients’ and controls’ blood samples were cultured in vitro with placebo, dexamethasone and tocilizumab. Supernates obtained from the cells cultures were analyzed with ELISA kits for IL4, INF gamma, IL17, IL6 and soluble IL6 receptor levels. The mean values of the interleukins levels in patients and controls basal (placebo) cultures and also in placebo, dexamethasone and tocilizumab cultures inside the patients group were compared.

Result
We included 12 patients and 12 healthy controls. For patients group we observed a decrease in IL6 levels in the supernatants of dexamethasone-cultured cells compared to placebo cultures of 88,79% (p=0.016). The mean value of IL6 levels in tocilizumab-cultured cells supernatants showed an increase of 18,34% comparing to placebo cultures (p=0.19). The mean values of IL6 soluble receptor were 42,56% lower (p=0.017) in dexamethasone cultures in patients group comparing to placebo cultures and 29,13% higher in tocilizumab group comparing to placebo group (p=0.12). There were no significant differences between mean levels of IL17, INF gamma or IL4 in the supernates of patients’ cell cultures with placebo, dexamethasone and tocilizumab.

The main levels of IL6 were also higher in patients’ basal (placebo) cultures group compared to healthy controls group although this difference was not statistically significant (1394,38 and 957,52 pg/mL respectively, p=0.19).

Conclusion
Our results suggest that IL6 is a common target of action of both dexamethasone and tocilizumab. The first drug seems to lower the production of IL6 while tocilizumab inhibits its actions by blocking its receptors. IL6 could be a promising biomarker in TED improving not only the understanding of its pathophysiology but also the treatment options.
Platelet-derived growth factor in the pathogenesis of Graves’ ophthalmopathy

W. Dik
Immunology, Laboratory Medical Immunology, Erasmus MC, University Medical Center, Wytemaweg 80, 3015 CN, The Netherlands

Aim
Activation of orbital fibroblasts resulting in excessive proliferation, cytokine and hyaluronan production and differentiation into adipocytes, is a main determinant of orbital tissue inflammation, remodeling and volume expansion in Graves’ Ophthalmopathy (GO). During the last years our group has shown that the platelet-derived growth factor (PDGF) isoforms PDGF-AA, PDGF-AB and PDGF-BB are elevated in orbital adipose tissue from GO patients with active and inactive disease.

Method
In vitro studies were performed using cultured orbital fibroblasts.

Result
In vitro studies demonstrated that these PDGF isoforms exhibit the capacity to stimulate proliferation, hyaluronan and cytokine production as well as adipogenesis by orbital fibroblasts. Moreover, PDGF-AB and PDGF-BB were found to increase thyroid stimulating hormone receptor (TSHR) expression on orbital fibroblasts, which enhances the orbital fibroblast activating capacity of TSHR stimulatory autoantibodies.

Conclusion
All this suggests an important role for the PDGF-system in orbital fibroblast activation in GO, which supports a therapeutic rationale for blocking PDGF signaling in GO. Here the contribution of PDGF to the pathophysiology of GO as well as therapeutic approaches to target this PDGF-system will be addressed.

Autophagy is involved in the initiation and progression of Graves’ Orbitopathy

J. S. Yoon, H. J. Lee, M. K. Chae, E. J. Lee
Department of Ophthalmology, Institute of Vision Research, Yonsei University College of Medicine, Seoul, Korea, Department of Ophthalmology, Yonsei University College of Medicine, 50-1 Yonsei-ro, Seodaemun-gu, Seoul, 120-752, Korea

Aim
To investigate the role of autophagy in the pathogenesis of Grave’s Orbitopathy(GO).

Method
Orbital adipose/connective tissue explants from patients with GO and from normal subjects, as well as isolated orbital fibroblasts, were analyzed. Adipogenesis was induced using differentiating medium with or without hydrogen peroxide, and autophagy was manipulated using bafilomycin A1 and Atg5-targeted short hairpin RNA (shRNA). Autophagosomes were identified by electron microscopy. Expression of autophagy-related genes and adipogenesis-related transcription factors were analyzed by real time reverse transcription-polymerase chain reaction and/or Western blot analysis. Lipid droplet accumulation was examined by Oil Red O staining.

Result
Autophagic vacuoles were more abundant in GO cells than in non-GO cells (p < 0.05). Expression of autophagy-related genes was significantly higher in GO tissues and cells than in their non-GO counterparts,respectively. Interleukin-1b increased LC3-II, p62, and Atg7 protein in GO cells. Autophagosome accumulation was shown at day 4 of adipogenesis and decreased by day 10, along with lipid droplet formation. Expression of LC3 and p62 proteins increased within 48 hours of differentiation and diminished gradually from day 4 to 10. Bafilomycin A1 treatment and Atg5 knockdown by shRNA inhibited lipid droplet accumulation and suppressed expression of adipogenic markers.

Conclusion
Autophagy was increased in GO tissue and cells compared to non-GO tissue and cells, suggesting that autophagy plays a role in GO pathogenesis. Autophagy manipulation may be a therapeutic target for GO.
Oral Presentation Abstracts

Case series of alemtuzumab (Campath-1H) induced Graves' Orbitopathy

R. Murthy, C. Moran, J. Jones, A. Coles, K. Chatterjee, P. Meyer
Thyroid Eye Disease service, Department of Ophthalmology, Addenbrooke’s Hospital, Cambridge University Hospital Foundation Trust, Hills Road, Cambridge, CB2 0QQ, United Kingdom

Aim
We present the first case series of Graves' Orbitopathy in patients with multiple sclerosis who have been managed with Alemtuzumab (Campath-1H), and discuss the theory of pathogenesis and risk factors.

Alemtuzumab (Campath-1H), a humanised monoclonal antibody against CD52, has been shown to effectively decrease relapse rate and disability progression in early active relapsing remitting multiple sclerosis, in our institution. Secondary autoimmune disorders have been described in 34% of these patients; specifically, thyroid autoimmune disease in over 20%.

Method
A retrospective review of electronic records of all patients managed by the Thyroid Eye Disease service between the years of 2000 and 2015 was performed. All patients that were referred with Graves Orbitopathy following the treatment of multiple sclerosis with Alemtuzumab are presented.

Result
Four patients with multiple sclerosis treated with Alemtuzumab were referred to the Thyroid Eye Disease service for the assessment and management of orbitopathy. There was an equal sex distribution, no family history of endocrine disease and all 4 were non-smokers at the time of developing ocular signs and symptoms. Active orbitopathy developed in two patients following radio-iodine (I131) treatment of their Graves' disease and in one, following relapse of Graves' disease after cessation of endocrine treatment. Three out of four had significantly raised TSH-Receptor antibody concentrations at the presentation of their eye disease; TSH-R antibody assays were not yet available when the first patient presented in 2001. Three of the patients were managed conservatively, but one required systemic immunosuppression for severe sight threatening disease.

Conclusion
Endocrine instability, radio-iodine treatment and high TSH-Receptor antibody concentrations are significant risk factors in the development of thyroid related orbitopathy and this is no different following Alemtuzumab treatment for multiple sclerosis. We recommend annual assay of TSH-R antibody levels in those treated with Alemtuzumab. Definitive treatments for Graves' disease, in these patients, risk exacerbating Thyroid Eye Disease and all such patients should first be referred for assessments to exclude dysthyroid orbitopathy. Those with Thyroid Eye Disease merit meticulous control of endocrine function and the early detection of recurrences.
Conjunctival venous flow reversal – A new sign for detecting raised venous pressure and localising space occupation in the orbit

P. Meyer, S. Theodoropoulou, R. Murthy
Department of Medical Ophthalmology, Addenbrooke’s Hospital, Cambridge, Hills Rd, Cambridge, CB2 0QQ, United Kingdom

Aim
Blood in radial anterior conjunctival venules lies at a watershed: it usually drains towards the limbal venous circle to episcleral veins that flow into the ophthalmic veins, cavernous sinus and internal jugular veins. However, anterior conjunctival veins can also drain, via open or potential shunts, into the eyelid circulation and external jugular system.

When orbital tension rises, or episcleral veins are compressed by enlarged rectus muscles, conjunctival venous flow reverses and is directed away from the limbus. This provides a useful physical sign that identifies affected muscles.

This study aims to validate the sign of conjunctival venous flow (CVF) reversal, by comparison with coronal Short-Tau Inversion-Recovery (STIR) MRI scans.

Method
CVF is recorded in all quadrants of both eyes on every patient attending the Addenbrooke’s Hospital Thyroid Eye Disease clinic. In 66 unselected coronal STIR MRI sequences from 54 patients, performed between March 2005 and September 2011, high signal in any rectus muscle was noted and their intensities were ranked by an observer who had no knowledge of the clinical findings. This was correlated with flow direction in the corresponding anterior conjunctival veins, observed during the clinic consultation closest to the scan date. CVF was also deemed to be reversed if this could be induced by eye movements.

In 11 patients who had undergone more than one study, we also compared changes in STIR MRI signal with the corresponding changes in CVF.

Result
Anterior CVF could be reliably observed in all fields of the 132 eyes – 66 studies.
CVF reversal in one or more quadrants was seen in 59 eyes (45%) – 40 studies.
Among these, the sign was found within 90 degrees of the rectus muscle showing the highest-ranking STIR signal in 52 eyes (88%), and corresponded exactly with the most active muscle in 36 of them (61%). By contrast, it arose over non-inflamed muscles, more than 90 degrees from the muscle with highest signal, in only 4 eyes.
Sequential observations showed that, although the resolution of rectus muscle inflammation can be followed by normalisation of CVF, it may persist.

Conclusion
Conjunctival venous flow reversal follows local compression of orbital veins or raised orbital tension. Its presence in only 45% of the eyes examined suggests that episcleral venous pressure must first exceed a threshold and, in our experience, the sign does signify more severe disease.

CVF reversal distinguished the sector hosting the most inflamed muscle in 88% of cases and identified that muscle in 61%. It does, therefore, permit objective clinical evaluation of regional contributions to orbital tension.

Our observations also suggest that diversion of venous drainage from the cavernous sinus and into the eyelid circulations may provide physiological orbital decompression in Thyroid Eye Disease.
Patterns of visual field changes in Thyroid Eye Disease compressive optic neuropathy

S. K. Freitag, C. J. Choi, S. Oropesa, A. Callahan, L. Glass, L. Teo, D. Cestari, M. Kazim
Ophthalmic Plastic Surgery Service, Massachusetts Eye and Ear Infirmary/ Harvard Medical School, 243 Charles Street, Boston, Massachusetts, 02114, USA

Aim
To describe the patterns of visual field change in Thyroid Eye Disease compressive optic neuropathy (TED-CON).

Method
This retrospective review examined Humphrey visual fields of 96 eyes in 68 patients with TED-CON between between April 1991 and July 2015 at two academic institutions. Patterns of visual field abnormality were described and compared with pre-specified patterns from the Ocular Hypertension Treatment Study (OHTS).

Result
There was a predominance of inferior visual field defects. These defects did not fit well into the pre-specified OHTS categories, with many TED-CON fields falling into the "other" category.

Conclusion
This is the first study, to the authors’ knowledge, analyzing automated visual field defects in TED-CON. Currently validated categories of visual field analysis are geared toward glaucomatous patterns and are not useful for analyzing TED-CON changes. Clinicians caring for patients at risk for TED-CON should be aware of this common pattern of inferior visual field deficit.

Digital infrared thermal imaging for early detection and disease monitoring of Thyroid Eye Disease

M. Edmunds, K. Hamilton, E. Moore, P. Nightingale, F. Mellington, K. Boelaert, A. Denniston
University Hospitals Birmingham NHS Foundation Trust, Mindelsohn Way, Birmingham, B15 2WB, United Kingdom

Aim
Current clinical examination techniques are insufficient to diagnose varying degrees of orbitopathy in patients with Graves’ Disease (GD) who do not have clinically obvious Thyroid Eye Disease (TED), and assessment of TED clinical activity can be challenging. In addition, orbital imaging signs of TED have previously been found in 70% of GD patients without clinically manifest TED. Digital Infrared Thermal Imaging (DITI) photography has been demonstrated to distinguish clinically active from quiescent TED. We aimed to assess the utility of DITI in detecting TED at the earliest possible stage in GD patients, and in monitoring disease activity in TED.

Method
Under standardised conditions of room temperature and humidity, 170 consecutive GD, 80 TED and 100 age- and sex-matched healthy controls (HC) underwent photography with a FLIR A650sc thermal imaging camera. Every subject underwent full ophthalmic assessment for evidence of TED. Seven periocular regions of interest were recorded for each orbit. GD and TED subjects had repeat thermal imaging on each attendance to clinic (median follow-up 12 months [range 4–18], median number of photographs, 3 [range 2–7]). Average tissue temperature at each region of interest was ascertained and statistical comparison between groups undertaken with ANOVA.

Result
Periocular tissue temperature was significantly greater in active versus quiescent TED patients (p<0.01), in keeping with previous studies. However, there was no significant difference in temperature at any of the regions of interest between GD, quiescent TED and HC subjects. In GD patients who developed signs of TED in the follow-up period there was a significant increase in thermal measurements commensurate with the degree of orbitopathy. There was no increase in temperature of those GD patients not developing TED.

Conclusion
DITI did not detect subclinical orbital inflammation in patients with GD in general. However, DITI did have potential diagnostic value in detecting early signs of orbitopathy in GD patients developing TED as well as in differentiating active orbitopathy from quiescent disease in those with established TED.
Quantitative T2 mapping and fat fraction measurements of extra-ocular muscles in Thyroid Eye Disease

T. Das, R. Murthy, A. Patterson, M. Graves, P. Meyer
Dept of Radiology and Dept of Ophthalmology, Cambridge University Hospitals NHS Foundation Trust, Hills Rd, Cambridge, CB2 0QQ, UK

Aim
The assessment of extra-ocular muscle inflammation in Thyroid Eye Disease (TED) relies mainly on clinical evaluation, supported by MRI scanning of the orbits. The only means of quantification of TED activity in current use is clinical activity scoring. Radiological quantification would transform our ability to select treatment modalities for our patients and monitor their response.

Longer T2 relaxation times correlate with greater extra-ocular muscle inflammation, but signal from fat can confound these quantitative measurements. The purpose of this study is to establish whether T2 mapping, in combination with fat fraction measurements of the extra-ocular muscles, could provide a robust quantitative measure of disease activity.

Method
30 patients with TED and 6 healthy controls were included in the study. MRI of the orbits was performed on a 1.5T MRI scanner (GE Healthcare) including coronal STIR, T2 multi-echo fast spin echo and multi-echo fast gradient echo sequences. 11 patients were re-scanned following appropriate treatment. STIR signal intensity ratios (SIR), T2 relaxation times and percentage fat fraction (FF) were measured for inferior, medial and superior rectus muscles bilaterally in all individuals. Correlation between T2 and SIR was calculated for each individual muscle. Mean values for T2, SIR and FF in all measured muscles were compared between the Thyroid Eye Disease and normal groups and also between initial and subsequent examinations within groups.

Result
For both TED and normal groups, there was a positive correlation between T2 and SIR (p < 0.001). Mean T2 for each rectus muscle category differed significantly between the TED and normal groups (p < 0.001). However, there was no significant difference when using mean SIR. Overall mean fat fraction was significantly greater in Thyroid Eye Disease patients than in healthy volunteers (p=0.021). There was substantial variability in the mean fat fraction for each muscle in the patient group. There was also a significant difference in mean T2 between pre- and post-treatment examinations in the TED group.

On an individual basis, a reduction in muscle T2 correlated with a reduction in CAS in most, but not all, patients.

Conclusion
Quantification of T2 relaxation times clearly differentiates abnormal from normal populations of extra-ocular muscles, as well as pre-treatment from post-treatment status, correlating with CAS. This appears to be a reliable measure of disease activity, allowing the assessment of individual muscles. Furthermore, we have demonstrated the feasibility of measuring fat fraction in extra-ocular muscles, thereby quantifying the relative contribution of fat and water to the T2 signal. Our physiological assessments of inflammation occasionally contradicted CAS scores, raising questions about the validity of clinical scoring of disease activity.
Epidemiological characteristics of 726 patients with dysthyroid orbitopathy followed between 1995 and 2013 in a multidisciplinary thyroid–eye consultation in Toulouse (France)

P. H. Imbert1, M. El Alaoui2, S. Grunenwald1, S. Huo Yung Kai3, M. Valet3, F. Boutault4, P. H. Caron2

1Ophthalmologist, Department of Endocrinology and Metabolic diseases, 2Department of Epidemiology, Health Economics and Public Health, 3Maxillofacial Surgery Department, 1Clinique du Parc, 2Hopital Larrey, 3UniversiteToulouse 3, 4CHU Purpan. 1Clinique du Parc – 105 rue Achille Vialieu, 2Service d’Endocrinologie du Professeur Caron – Hopital Larrey – 24 chemin de Pouzouville, Toulouse, 31400, France

Aim
Epidemiological characteristics of 726 consecutive patients with dysthyroid orbitopathy followed between 1995 and 2013 in a multidisciplinary thyroid–eye consultation in Toulouse (France).

Method
Dysthyroid orbitopathy (DO) is the most frequent extra-thyroidal manifestation of Graves’ disease, but it may be observed in patients with Hashimoto’s thyroiditis, and even in patients with no thyroid dysfunction. Oral or intravenous corticosteroids with or without orbital radiotherapy are indicated in active DO whereas rehabilitative surgery may be required depending on DO sequelae. In order to improve the diagnosis and treatment of DO patients, a multidisciplinary and outpatient thyroid–eye consultation was developed in 1995 in Toulouse (France).

Result
Out of 726 patients seen, 82.2% were women and 89.6% with Graves’ disease. Mean age was of 48.5 years. Patients were treated with anti-thyroid drugs (33.9%), thyroidectomy (8.6%), radioiodine therapy (2.1%) or combined therapies. 39.9% were active smokers. DO was observed before (11.8%), concomitantly (38.3%) or after (49.9%) the onset of hyperthyroidism. Signs of DO were upper lid retraction (82.5%), exophthalmos (72.7%), or diplopia (42.6%). DO was mild (43.2%), moderate (27.1%) and severe (29.7%) with sight-threatening forms in 30 patients. Severity of DO was related to age (p=0.022), male sex (p<0.001), radioiodine therapy (p<0.001), an episode of hypothyroidism (p=0.049) while no association was found with cigarette smoking.

Conclusion
We report the epidemiological characteristics of a large cohort of consecutive DO patients followed in Toulouse (France) during the last two decades.

The management of Thyroid Eye Disease by immunomodulation – The Cambridge regime

N. Ghadiri, R. Murthy, P. Meyer
Department of Medical Ophthalmology, Addenbrooke’s Hospital, Hills Road, Cambridge, CB2 1QQ, United Kingdom

Aim
We present the results of the largest case series of patients with active thyroid optic neuropathy or severe ocular motility disturbance, who have been treated by immunosuppression. All were managed with the Cambridge Regime: intravenous methylprednisolone, oral prednisolone and ciclosporin A, in combination. The follow-up ranged from 3 to 16 years. A number of patients had previously failed multiple pulses of intravenous methylprednisolone, administered as a sole agent in other units.

Method
A retrospective review of electronic case records from 1994 to 2016 found 145 patients with sight-threatening Thyroid Eye Disease (optic nerve compression, evidenced by reduced visual acuity, colour vision and field loss; or severe ocular motility disturbance) who were treated with the Cambridge regime. All identifiable drives were controlled, after which treatment was initiated with three intravenous pulses of methylprednisolone. Ciclosporin A (target level 200mcg/l) and oral prednisolone 30mg were started concurrently, then tapered off over the following 18 months.

Result
All 145 patients were followed up for a minimum of three years. This medical management was successful for 69 of 75 (92%) patients with optic nerve compression. 70 patients (93%) recovered normal visual acuities and 69 (92%) recovered normal visual fields. The effect of this regime on the control of dysthyroid strabismus will be presented.

Morbidity from the treatment was low, with the main adverse effects being impaired renal function in 10 patients and hypertension in 5 patients.

Conclusion
These results confirm that the appropriate use of immunomodulation is able to exact and maintain remission of Graves’ orbitopathy, with reversal of optic neuropathy and symptomatic recovery of motility in the majority of patients.
Efficacy of combined orbital radiation and systemic steroids in the management of Graves' orbitopathy

Y. Seo, J. W. Kim, S. H. Han, B. J. Son, T. H. Rim, K. C. Keum, J. S. Yoon
Department of Ophthalmology, Institute of Vision Research, Yonsei University College of Medicine, Seoul, Korea, Department of Ophthalmology, Yonsei University College of Medicine, 50-1 Yonsei-ro, Seodaemun-gu, Seoul, 120-752, Korea

Aim
To compare the efficacy and safety of combination therapy with orbital irradiation and systemic steroids versus steroid monotherapy in the management of active Graves' Orbitopathy (GO).

Method
The clinical charts of 127 patients with active inflammation due to GO who received intravenous steroid pulse therapy as a first-line treatment with or without orbital radiotherapy between 2010 and 2014 were reviewed. Patients were divided into two treatment groups: 1) combined orbital radiotherapy and steroid pulse therapy (SRT group) and 2) steroid pulse therapy only (ST group). Primary outcome measures included clinical activity score (CAS); NOSPECS classification; ocular motility impairment; and exophthalmos at 1, 3, 6, and 12 months after treatment. The secondary outcome measure was the change in orbital, extraocular muscle volume (EOM), and fat volume after treatment measured by orbit computed tomography.

Result
Sixty-eight patients were included in the SRT group, and 59 patients were in the ST group. In both treatments, CAS and NOSPECS were significantly reduced. In the comparison of the degree of change from baseline between the groups, the SRT group demonstrated more improvement in NOSPECS and scores of ocular motility. Orbital, EOM, and fat volume significantly decreased in the SRT group; however, only fat volume was reduced in the ST group. Compressive optic neuropathy after treatment developed in 0% of the SRT group and 3.4% (2/59) of the ST group. Reactivation of inflammation occurred in 11.8% (8/68) of the SRT group and 28.8% (17/59) of the ST group.

Conclusion
Orbital radiotherapy in combination with steroid treatment significantly improved ocular motility by reducing EOM volume in patients with active GO.

Orbital anatomy – Important surgical landmarks in orbital decompression

Y. Takahashi
Oculoplastic, Orbital & Lacrimal Surgery, Aichi Medical University Hospital, Aichi Medical University Hospital, 1-1, Yazakokarimata, Nagakute, Aichi, 480-1195, Japan

Aim
To show the anatomy of the deep lateral and medial orbital walls and its surgical implications in orbital decompression.

Method
Literature on the anatomy of the deep lateral and medical orbital walls was reviewed. In addition, cadaver dissection and computed tomographics studies were performed to illustrate the anatomy.

Result
An anatomical overview will be provided and the detailed surgical anatomy of the posterior and superior borders of the deep lateral orbital wall, the posterior and accessory ethmoidal foramina, and the frontoethmoidal suture will be elucidated.

Conclusion
The anatomy of the deep lateral and medical orbital walls presented here will warrant safe and confident performance of orbital decompression surgery.
Rethinking the orbital strut in inferomedial orbital decompression

C. Petris, MD, M. Kazim, MD
Ophthalmology, University of Missouri - Columbia, 1 Hospital Drive, Columbia, 65211, USA

Aim
To characterize the inferior orbital strut (IOS) and orbital volume and determine the postoperative effects of strut excision in bony orbital decompression.

Method
The orbital struts and orbital volumes were analyzed grossly and radiographically. Post-operative outcomes of patients having undergone inferomedial decompression with IOS excision were reviewed.

Result
Cadaveric struts (4) were defined and gross measurements taken of the anterior (7.43mm), mid(25.9mm), and posterior strut(6.3mm). Orbital strut volume(111 controls) was found for the mid (0.270 cc) and posterior(0.19 cc) strut. Twenty-five patients(42 orbits) having undergone non-strut-preserving inferomedial decompression had a 5mm reduction of proptosis; one developed torsional strabismus and none had hypoglobus.

Conclusion
While the orbital strut volume is small, there is great potential for enhancement of orbital decompression with rare complications.

The greatest experience of bony orbital decompression in TED in Russian Federation

Y.O. Grusha, P.A. Kochetkov, D.S. Ismailova, N.Y. Sviridenko
Ophthalmic plastic and reconstructive surgery department, Institute of Eye Diseases of Russian Academy of Medical Sciences, Rossolimo 11A, Moscow, 119021, Russia

Aim
To analyze the results of bony orbital decompression (OD) in the biggest cohort of patients with Thyroid Eye Disease (TED) in Russian Federation.

Method
91 patients (134 orbits) with TED were enrolled into the study. Mean age was 57,1±8,9 y.o. (from 32 to 76 y.o.). Mean duration of the disease was 25,4±31,9 months (from 2 mo to 11 years). Deep lateral wall OD was performed in 86 cases, balanced lateral and medial wall OD – in 48 cases, in 37 patients intervention was bilateral. It is remarkable that balanced OD was performed by ophthalmologist (lateral wall) in cooperation with ENT-specialist (medial wall). Color and contrast sensitivity testing, OCT were used to assess optic nerve head and RNFL-thickness. The main outcome measures were BCVA, reduction of proptosis and keratopathy one month after surgery.

Result
The indications for surgery were optic neuropathy (49 orbits), corneal damage (27 orbits) and disfiguring exophthalmos (58 orbits). BCVA significantly improved from preoperative 0,68±0,47 till 0,8±0,32 (p<0,05). There was a mean reduction in proptosis of 4,4±1,9mm (p<0,05). In all cases of keratopathy or corneal ulcer improvement and epithelization were achieved, though in 4 patients corneal haze in the optic zone decreased final BCVA.

Conclusion
In this first and greatest study of bony orbital decompression in Russian Federation efficiency has been shown in all 134 TED cases.
Medial wall and internal inferior wall decompression through a superior eyelid crease approach – Personal technique

J. Perez-Moreiras, G. Castela, C. Prada Sanchez, A. Alvarez
Instituto Internacional de Oculoplastica, Orbita y Tiroides. Universidad de Santiago de Compostela, España., Universidad de Coimbra, Portugal, Santiago de Compostela, España

Aim
To present our personal technique on medial and inferior wall decompression through a superior eyelid crease approach.

Method
20 years ago using microsurgery, we designed a new technique that permits the decompression of all the ethmoid (retaining the periosteum) and part of the strut and rear floor of orbit reducing the exophthalmos in 4 mm. Through a medial superior eyelid aperture a lipectomy of medial superior quadrant of the orbit is performed and then the nasal periostium is achieved. An incision in the periosteum is done separating it totally from the bone wall until the apex of the orbit is reached close to the lower wing of the sphenoid bone. Following all the ethmoid bone, strut and posterior part of the orbital floor is removed. The periostium is never opened reducing the risk of postoperative horizontal diplopia.

Result
In the last 20 years we have decompressed with this technique more than 1,000 orbits. Evaluation of the last 125 patients will be performed to assess the mm of decompression and presence of convergent strabismus in the post-surgery. The preservation of the periosteum avoids postoperative horizontal diplopia and reduces exophthalmia 1 mm less than when the periostium is opened.

Conclusion
This decompression technique achieves good results in terms of reducing exophthalmos avoiding the risk of postoperative convergent strabismus.

Endoscopic versus external medial orbital wall decompression in Thyroid Eye Disease – A prospective, randomised controlled pilot study

T. G. Hardy, A. A. McNab, P. Michael
Departments of Orbito-Plastic and Lacrimal Surgery and Otolaryngology Surgery, Royal Victorian Eye and Ear Hospital, 32 Gisborne Street, East Melbourne, Melbourne, 3002, Australia

Aim
A pilot study to compare the outcomes and complications from external (transconjunctival) and endonasal endoscopic approaches to the medial orbital wall, in conjunction with lateral wall +/- floor decompression in patients with bilateral inactive Thyroid Eye Disease.

Method
Consecutive eligible patients were prospectively randomly allocated using online randomisation software to either endoscopic or external medial wall decompression, in conjunction with lateral wall +/- floor decompression.

Result
Ten patients aged 36-64 (mean 49) years underwent bilateral orbital decompression from May 2015 to February 2016 by a single orbital surgeon(TGH) +/- ENT surgeon (PM). The amount of proptosis reduction (mm) was slightly greater for combined 3 wall (mean 5.25, range 5-6) vs purely external 3 wall (mean 4.5, range 4-5) decompression. For purely external 2 wall decompression, the proptosis reduction was 2-5 (mean 4) mm proptosis reduction (combined 2 wall data pending). There was no new onset or worsening of preoperative diplopia or other major complication. Operating time was longer for combined procedures compared with purely external (2 wall: 270 vs 185 minutes; 3 wall: 280 vs 210 minutes respectively).

Conclusion
A combined approach offers potentially greater proptosis reduction for 3 wall decompressions, with somewhat longer operating time owing to additional equipment and set-up time. Longer follow up studies will yield whether inclusion of an endoscopic antrostomy also reduces complications of post-operative maxillary sinusitis.
Efficacy of lateral orbital rim decompression in patients with prior rim-sparing three-wall orbital decompression

W. L. Bradford, MD, MSc; J. S. Kim, MD; R. L. Scawn, MRBS; D. O. Kikkawa, MD, FACS; B. S. Korn, MD, PhD, FACS
Ophthalmology, Shiley Eye Institute, University of California San Diego, 9415 Campus Point Drive, La Jolla, CA, 92037, USA

Aim
For severe exophthalmos, “maximal decompression” typically refers to a rim-sparing, three-wall orbital decompression with fat removal. However, some cases may have residual exophthalmos or may reactivate, necessitating further decompression. Some surgeons may not remove the lateral orbital rim due to concerns about functional impairment and cosmetic deformity. Others remove the rim and then replace the rim at the end of the decompression surgery. This study evaluated functional, cosmetic, and patient satisfaction outcomes associated with secondary lateral orbital rim decompression (LORD) in subjects who had undergone previous rim-sparing, three-wall orbital decompression with continued symptomatic exophthalmos.

Method
This retrospective case series included 11 subjects with severe TRO who had undergone prior rim-sparing, three-wall orbital decompression who subsequently underwent LORD surgery for residual exophthalmos. Through an eyelid crease incision, osteotomies were created in the lateral orbital rim at the fronto-zygomatic suture and just above the zygomatic arch, using an oscillating saw (n=8) or a diamond burr drill (n=3). Primary outcomes included change in exophthalmos, change in relative proptosis, surgical complications, cosmesis of the lateral canthal region, presence of masticatory oscillopsia, development of worsened diplopia, and patient satisfaction. Secondary outcomes included changes in MRD1, MRD2, and exposure keratopathy.

Result
Eleven orbits underwent secondary LORD surgery. Mean pre-operative exophthalmometry for the operative eye was 24.0 mm with 2.7 mm of relative proptosis. LORD resulted in a mean reduction in proptosis of 2.5 mm (Range: 0.5 to 5.0 mm, p<0.001). There was no significant change in lagophthalmos, MRD1, MRD2, or exposure keratopathy. There were no instances of complications such as worsened diplopia, decreased vision, pupillary abnormalities, or masticatory oscillopsia. No external deformities of the lateral canthal region were appreciable by physician or patient. All subjects reported satisfaction with functional and cosmetic outcomes of LORD, and none reported problems with external contour irregularities of the lateral canthal region.

Conclusion
Lateral orbital rim decompression serves as an effective technique for treating severe TRO for which there is residual exophthalmos following rim-sparing, three-wall orbital decompression surgery. LORD results in a significant reduction in proptosis and can be performed safely with a high degree of patient satisfaction. Despite concerns about functional or cosmetic defects to the lateral canthal region, none of these were noted by physicians or patients following LORD. As such, LORD may be considered an option as part of a “maximal orbital decompression” or to maximize the decompressive effect of primary lateral orbital decompression surgery.
Rectus muscle resection to correct vertical ocular misalignment in Thyroid Eye Disease

A. Grixti, F. Tacea, I. Marsh, K. Ziahosseini
Ophthalmology, Longmoor Lane, Liverpool, L9 7AL, United Kingdom

Aim
Strabismus surgery in Thyroid Eye Disease (TED) is challenging and usually involves recession rather than resection of fibrosed rectus muscles, because of the risk of reactivating inflammation or worsening restriction. However, for some patients with residual deviation and diplopia in primary gaze despite recession surgery, rectus muscle resection may be beneficial.

To report our surgical experience with rectus muscle resection to correct vertical ocular misalignment associated with TED.

Method
Retrospective review of 12 consecutive patients (13 eyes) with TED and diplopia, who underwent vertical rectus muscle resection by a single surgeon at a referral centre in Liverpool, UK, from 1997 to 2013. The initial goal was elimination of diplopia in primary position. Vertical deviations were determined before and then after surgery at 4 weeks, 4 months and last visit by alternate prism cover testing at 1/3 meter and 6 meters.

Result
Mean vertical deviation for distance and near measured, 13.5Δ±16.2Δ and 10.5Δ±7.7Δ preoperatively; 0.5Δ±0.7Δ and 2Δ±2.8Δ at 4 weeks; 2Δ±2.8Δ and 2.5Δ±3.5Δ at 4 months; 2Δ±3.5Δ and 1.5Δ±2.1Δ at final follow-up. Inferior rectus was resected in 8 eyes (mean 4mm, range 3-5mm) and superior rectus in 5 eyes (mean 5.5mm, range 3-7mm). At final follow-up, 7 patients achieved binocular single vision in primary gaze without prisms. Further recession surgery was necessary in 3 subjects with persistent diplopia. None of the patients developed atypical inflammation or increased muscle restriction.

Conclusion
This is the largest series of patients with hypotropia and TED successfully managed with vertical rectus muscle resection in the absence of adverse sequelae.

Fat transposition to keep the lid crease in the right place in case of levator recession

P. Escalas
Oculoplastic, Polyclinique de l’Atlantique, Av Claude Bernard, Saint Herblain, 44819, France

Aim
To avoid an upper displacement of the lid crease after a levator recession to correct a lid retraction.

Method
A video shows the technique of the upper fat transposition.

Result
This technique avoids or reduces the post op asymmetry of the lid crease, especially in case of unilateral lid retraction in Thyroid Eye Disease.

Conclusion
The management of the position of the lid crease is critical to improve the cosmetic result in lid retraction correction with levator recession. Upper fat advancement is helpful to keep the crease in the proper position.
Seamless simultaneous surgery for upper and lower eyelid retraction in TED

S. K. Freitag, N. G. Lee, J. Hall
Ophthalmic Plastic Surgery Service, Massachusetts Eye and Ear Infirmary/ Harvard Medical School, 243 Charles Street, Boston, Massachusetts, 02114, USA

Aim
To report a novel technique of simultaneous repair of upper and lower eyelid retraction without a cutaneous incision in patients with Thyroid Eye Disease.

Method
The upper eyelid is recessed internally after harvest of a free tarsoconjunctival graft via the same incision. The lower lid is internally recessed at the inferior tarsal border and the graft placed. Outcomes were determined in 28 eyelids by standard eyelid measurements with follow up ranging from 2 to 16 months.

Result
The change in margin to reflex distance 1 (MRD1) ranged from 0.5 to 4 mm with an average of 1.8 mm. The change in margin to reflex distance 2 (MRD2) ranged from 1 to 3.5 mm with an average of 2.0 mm. No patients had post-operative lagophthalmos and all had ocular surface improvement.

Conclusion
Free tarsoconjunctival posterior spacer grafting to the lower lid combined with simultaneous internal recession of the upper eyelid is an elegant, rapid and effective method of repairing eyelid retraction secondary to TED.
Aim
To review the treatment response to combined intravenous steroid and orbital irradiation in Asian patients with active Thyroid Eye Disease (TED).

Method
Single center retrospective case control review on active Thyroid Eye Disease patients.

VISA classification protocol was used for classification of TED activity and severity. Intravenous (IV) steroid therapy at dosage of 1g/hour/day was instituted for patients with inflammatory score >4, followed by orbital radiation.

Patient demographics, the time of diagnosis of active disease to institution of treatment, disease severity and treatment outcomes (visual acuity, inflammatory scores, extra ocular motility) were analysed.

Result
Sixteen patients (11 Males: 5 Females) were included in this study [mean age 55.2 (range 43-86) years]. 81 % (Thirteen patients) had active and severe Thyroid Eye Disease. 13 of 16 patients (81.3%) had developed active severe disease within a year of their thyroid dysfunction diagnosis.

Amongst them, six patients (37.5%) had compressive optic neuropathy (CON), five (31.3%) had disabling diplopia in their central 30-degree field of vision and eight (50%) had exposure keratopathy at presentation.

19% were foreign patients and were unable to receive adequate treatment at the time of diagnosis in their home country. The average time to receiving IV steroid therapy upon diagnosis of active disease at our centre was 7.2 (range 0.1 to 20.8 )weeks. Concurrent receipt of orbital irradiation treatment averaged 11.6 (range 0.8 to 41.6) weeks. This was planned for thirteen patients. Two patients received DXT late in the course of their treatment due to their refusal for decompression surgery and one was medically unfit for continued steroid therapy.

There was significant improvement of visual acuity (p<0.01) as well as inflammatory scores (p<0.002) at 6 months post combination therapy. None of the patients developed CON during the course of their treatment. No significant deterioration in extra-ocular motility was noted (excluding those who underwent orbital decompression).

In the 40% (six) of patients who eventually underwent orbital decompression for disease progression; four had CON at presentation, two were heavy smokers. Three of them required more than 1 cycle of IV steroid therapy to control their disease process.

Conclusion
Combined intravenous steroid therapy with orbital irradiation significantly improved vision and inflammation in our cohort of active severe TED patients by controlling disease activity. However it is unable to reverse compressive optic neuropathy once that is established and the need for orbital decompression eventually.
The inflammatory clock in Thyroid Eye Disease – A case report, Poster 2

S. R. De Silva, A. Naughton, R. Khooshabeh
Department of Ophthalmology, Stoke Mandeville Hospital, Mandeville Road, Aylesbury, HP21 8AL, UK

Aim
Diurnal variation of congestion in Thyroid Eye Disease is a well recognised feature and is included in the VISA (but not the EUGOGO) classification of disease. We describe a patient presenting with severe diurnal fluctuation of strabismus in this condition, whose disease severity was significantly underestimated when she was initially reviewed in our afternoon clinic.

Method
A case report and literature review.

Result
A 50-year-old patient presented to the eye clinic with extremely troublesome symptoms of double vision that occurred daily on waking and lasted three to four hours. She was on treatment for hyperthyroidism. The patient attended our afternoon assessment clinic where she was found to have mild signs of Thyroid Eye Disease, full ocular movements and a low clinical activity score. Her complaints were at times dismissed or she was trivialised as a ‘difficult patient’ due to a lack of objective signs. However marked strabismus was measured when she was reassessed in a morning clinic. The patient was treated with intravenous steroids and posterior orbital radiotherapy, following which resolution of symptoms was achieved.

Conclusion
Thyroid Eye Disease is a complex autoimmune inflammatory condition characterised by cellular infiltration of orbital adipose tissues and extraocular muscles, with associated production of cytokines and inflammatory mediators. Circadian changes in cytokine levels are known to occur in inflammatory conditions with diurnal variation such as rheumatoid arthritis. A similar mechanism may underlie diurnal variation of strabismus seen in this patient. We propose that Thyroid Eye Disease clinics would preferably be held in the morning to accurately measure disease severity. We emphasise the need to consider treatment in such cases, where despite a low clinical activity score, there may be significant improvement in symptoms and quality of life.

Orbital lymphoma masquerading in young patient with Graves Ophthalmopathy, Poster 3

E. Farah, J. Meney, M. Zmuda, M. Putterman, O. Galatoire
Ophtalmology Department, Adnexal Service, Fondation Ophtalmologique A de Rothschild, 23-28 Rue Manin, Paris, 75019, France

Aim
Thyroid Eye Disease is the most common cause of proptosis in adults, among the other less common causes orbital lymphoma should be considered in the differential diagnosis.

Method
39 years old patient with 6 months history of TED presented to the emergencies with unilateral axial proptosis of the right eye and acute visual loss with RAPD in two weeks time.

Result
Orbital MRI showed enlarged extraocular muscles and compressive optic neuropathy, initially an intra venous bolus of methylprednisolone was performed but later a biopsy was decided because of the unusual form of the orbital lesion. The Biopsy revealed a B cell type non Hodgkin Lymphoma.

Conclusion
Even when elements clearly indicate the presence of TED, unsatisfactory results or disease deterioration should raise a suspicion and always lead to surgical biopsy to exclude malignancy.
The role of rectus muscle myectomy in the management of large angle strabismus for Graves’ ophthalmopathy, Poster 4

Presenter: J. Y. Hung, MD,1 Corresponding author: S. L. Liao, MD2

Department of Ophthalmology, 1 Taipei Medical University Hospital, 1 No.252, Wu Hsing Street, Taipei City 110, Taiwan (R.O.C.), 2 No.1, Changde St., Zhongzheng Dist., Taipei City 10048, Taiwan (R.O.C.), Taipei City, 10048, Taiwan (R.O.C.)

Aim
To investigate the role of rectus muscle myectomy for the treatment of large-angle strabismus in patients with Graves’ ophthalmopathy.

Method
The study is a retrospective noncomparative case series. Forty-seven patients with Graves’ ophthalmopathy who demonstrated strabismus greater than 25 prism dipters underwent complete myectomy of the rectus muscles for large-angle strabismus. Postoperative diplopia and deviation in primary position measured in prism dipters. Functional binocular vision and postoperative deviation of less than 5 dipters are considered as successful surgical outcomes.

Result
Patients undergoing complete myectomy of the restricted muscles in large-angle strabismus achieved a 78.7% success rate after the first surgery. Reoperation performed on 7 patients resulted in 85.7% success rate. The overall success rate was 91.5%. The mean efficacy of the isolated rectus muscle myectomy was 34.3 + 7.7 prism dipters.

Conclusion
The complete rectus muscle myectomy technique is effective and predictable in the treatment of large-angle strabismus in patients with Graves’ ophthalmopathy.
Blood flow changes of Grave's ophthalmopathy observed with laser speckle flowgraphy, Poster 5
T. Kashima, K. Nitta, T. Endo, H. Akiyama
Department of Ophthalmology, Gunma University, Japan

Aim
To evaluate the changes of blood flow of Grave's ophthalmopathy (GO) patients using laser speckle flowgraphy (LSFG).

Method
This retrospective study examined eight eyes of four active GO patients (47±17 years) whose thyroid functions had been controlled by physicians. All patients were treated with intravenous high dose glucocorticoid therapy followed by orbital radiotherapy and oral prednisone. LSFG was performed before and at 1, 3, and 6 weeks after the treatment. One of the LSFG's parameters measured was the mean blur rate (MBR) of the fovea. This parameter is correlated with the choroidal blood flow velocity, and is referred to as the MBR choroid. Other indicators of the orbital inflammation that were measured included the clinical activity score (CAS) and the MRI signal intensity ratio (MRI SIR). The normal control group consisted of eight age- and sex-matched normal eyes.

Result
The average of the MBR choroid was 8.13 before treatment and 9.16 at 6 weeks after treatment, which was a significant increase of 15%. Before and at 6 weeks after treatment, CAS scores were 2.25 and 1.25, while the MRI SIR values were 21.5 and 14.3, which indicated improvement of the orbital inflammation and edematous change. Ocular perfusion pressure and subfoveal choroidal thickness showed no significant fluctuations throughout the treatment period.

Conclusion
Although the MBR choroid, which is correlated with choroidal blood flow velocity, is decreased in GO patients, it tends to improve after treatment. The MBR choroid changes might primarily be related to an improvement of the orbital inflammation or a reduction of orbital pressure.

Euthyroid Graves' Orbitopathy, Poster 6
J. K. Seng Lee1, L. L. Seah2
1Department of Ophthalmology and Visual Sciences, Khoo Teck Puat Hospital, Singapore
2Department of Ophthalmology, Singapore National Eye Centre, Singapore

Aim
Euthyroid Graves' Orbitopathy is very uncommon with a reported prevalence of 0.7% in Asians with Graves' ophthalmopathy. The diagnosis of EGO can be overlooked due to its low incidence and infrequent investigation of anti-thyroid antibodies by managing ophthalmologists. We present a short series of EGO, their presenting symptoms and discuss the role of serological investigations in the diagnosis of EGO.

Method
Retrospective case series.

Result
A total of 7 patients (4M, 3F) with a mean age of 46.6 ± 14.8 years were followed up for a mean duration of 41 months. Over two-thirds (71.4%) of the patients had advanced restrictive myopathy at the time of referral to the ophthalmologist. During the course of follow-up, two patients required intravenous methylprednisolone and two required surgical intervention. All patients eventually had bilateral involvement.

All patients presented with 1 or 2 radiological features of Graves' ophthalmopathy including fusiform extraocular muscle enlargement with tendon sparing or proptosis. Serological investigations revealed that all patients were euthyroid at the time of presentation with normal fT4, fT3 and TSH levels. Almost one third (28.6%) had elevated TRAb levels on presentation while 71.4% had elevated thyroid stimulating immunoglobulin (TSI) during the course of follow-up.

About half of the patients (42.9%) subsequently developed hyperthyroidism after a median period of 24.3 months with 4 remaining euthyroid.

Conclusion
The diagnosis of EGO can be challenging in cases that have an atypical presentation of myopathy with normal thyroid function. Thyroid antibodies and imaging studies are useful in the early diagnosis of EGO, hence allowing for early treatment to reduce morbidity.
Aim
To evaluate the relative position of the orbit and the brain before and after balanced maximal deep lateral and medial decompression for thyroid-related orbitopathy (TRO).

Method
Pre and postoperative orbital CT imaging following deep lateral and medial balanced decompression were retrospectively reviewed for 75 orbits in 48 patients. Pre-operative and post-operative axial CT images were selected for review at the level of the superior orbital fissure and immediately below the anterior clinoid. The pre-op and post-op images were resized and superimposed by aligning the marrow of the sphenoid bones. A window was then defined and placed over the superimposed image (Figure 1). The percentage area of this window occupied by orbit and brain was measured in both pre-operative and post-operative images (Figures 2 and 3). Posterior brain movement was also assessed by measuring the anterior-posterior distance between the furthest anterior position of the brain in the pre-op image and the furthest anterior position of the brain in the post-op image (Figure 4).

Result
The mean composition of the window by area in the pre-op image was 0% orbit, 56% bone, and 44% brain. The mean composition in the window by area in the post-op image was 70% orbit, 2% bone, and 28% brain. 74 out of 75 orbits demonstrated posterior movement of the brain from pre-operative to post-operative position, with an overall mean of 2.0mm (SD).

Conclusion
There is posterior movement of both the orbit and the brain after deep lateral and medial balanced decompression for TRO. Further studies utilizing volumetric analysis of the brain before and after decompression are needed.
**Ultrasonic knife blade versus sagittal saw blade for en bloc lateral wall decompression in patients with Thyroid Eye Disease, Poster 8**

J. Nguyen, MD; A. Whittington, MD; J. Abboud, MD PhD; J.R. Sivak-Callcott, MD; H. Ramadan, MD

Ophthalmology & Otolaryngology, West Virginia University, 1 Medical Center Dr., Morgantown, WV, 26508, USA

**Aim**
To evaluate the efficacy of ultrasonic knife blade during en bloc lateral wall decompression surgery with rim removal for Thyroid Eye Disease.

**Method**
This retrospective, comparative, interventional case series was collated from patients with Thyroid Eye Disease who underwent combined endoscopic medial wall/floor and en bloc lateral wall decompression surgery from 2005 to 2015. Patients were excluded if they had other coexisting orbital conditions or concurrent extraocular muscles or eyelid surgery. Primary measure outcomes included visual acuity, proptosis, lagophthalmos, eyelid retraction, exposure keratopathy, and surgical complications.

**Result**
Sixteen en bloc lateral wall decompressions were reviewed. The Sonopet Ultrasonic Aspirator with Nakagawa knife blade was used to remove the lateral wall in 10 cases, and a CORE/TPS sagittal saw with 10mm blade width was used in the other 6 cases. Average follow time were 7.13 months in the Sonopet group and 14.2 months in the saw group. There was no significant difference between the groups in post-operative visual acuity, proptosis, lagophthalmos, eyelid retraction, exposure keratopathy, or surgical complications. The average reduction in proptosis was 6.1 mm in the Sonopet group, and 4.7 mm in the saw group (p = 0.334). In our series, the average surgical case time was slightly shorter in the saw group than in the Sonopet group.

**Conclusion**
Ultrasonic knife blade is a safe and effective alternative to sagittal saw during en bloc lateral wall decompression for Thyroid Eye Disease.

**PDGF-BB enhances the proliferation of cells in human orbital fibroblasts by suppressing PDCD4 expression via up-regulation of microRNA-21, Poster 9**

S. H. Park¹, J. Paik², S. Lee², S. Yang¹

¹ Department of Ophthalmology and Visual Science, ² Department of Pathology

¹ Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea, ² College of Medicine, The Catholic University of Korea, Seoul, Korea

Seoul St. Mary’s Hospital, The Catholic University of Korea, Seoul, Korea, 222 Banpo-daero, Seocho-Gu, Seoul 137-701, Republic of Korea, Seoul, 137-701, Republic of Korea

**Aim**
The aim of this study was to investigate the effect of platelet-derived growth factor1(PDGF)-BB on the proliferation of cells and its possible mechanism in human orbital fibroblasts.

**Method**
Human orbital fibroblasts were obtained from orbital fat from decompression surgery in patients with thyroid-associated ophthalmopathy(TAO). The cells were treated with PDGF-BB, and the number of cells was counted using an Advanced Detection and Accurate Measurement(ADAM) automatic cell counter. The expression of programmed cell death 4 (PDCD4) was determined by Western blotting. The effect of PDCD4 on cell proliferation was evaluated using PDCD4 small interfering RNA (siRNA)-transfected cells. The level of microRNA-21 (miRNA-21) was measured by quantitative real-time RT-PCR. In addition, the role of miRNA-21 in the proliferation of PDGF-BB-treated cells was assessed by means of anti-miRNA-21 siRNA and resveratrol, an inhibitor of miRNA-21.

**Result**
PDGF-BB was found to enhance cell proliferation, whereas it inhibited PDCD4 expression in human orbital fibroblasts. Down-regulation of PDCD4 by PDCD4 siRNA transfection significantly increased the number of human orbital fibroblasts. In addition, PDGF-BB increased the level of miRNA-21 in human orbital fibroblasts. Transfection with anti-miRNA-21 and treatment with resveratrol partially restored the expression of PDCD4 and led to a reduction in cell number in PDGF-BB-treated orbital fibroblasts. At the end of the follow-up period, all patients except for one patient had best corrected vision of 6/12 or better in both eyes.

**Conclusion**
PDGF-BB enhances proliferation by suppressing PDCD4 expression by upregulation of miRNA-21 in human orbital fibroblasts. These results suggest that PDGF-BB stimulates cell proliferation through microRNA-21-mediated PDCD4 down-regulation, leading to the development of TAO.
Acromegaly with orbitopathy mimicking Thyroid Eye Disease – What is the role of IGF-1?

Poster 10

T. Parmar, R. Davies, C. Kopsidas, A. Haridas, D. Morris
Department of Ophthalmology, University Hospital of Wales, Heath Park, Cardiff, CF14 4XW, UK

Aim
To present a clinical, radiological and pathological review of a case of acromegallic eye disease secondary to a large pituitary adenoma, initially diagnosed as euthyroid Thyroid Eye Disease.

Method
Retrospective case review.

Result
A 31-year-old female with a 12-month history of bilateral lid swelling and epiphora was initially diagnosed clinically with euthyriod eye disease. 11 months post-presentation, due to a deterioration in signs and symptoms, CT imaging was organized and revealed a large pituitary adenoma. Endocrinology review confirmed features of acromegaly and a consistent biochemical profile, with raised IGF-1 levels. TFT’s and TSH-Receptor antibodies were normal throughout. The eye symptoms progressed (persistent pain, swelling and diplopia) and were refractory to conventional treatments for the pituitary tumour (surgery, radiotherapy and octreotide), as were the IGF-1 levels. Orbital symptoms responded to high dose steroids but systemic side effects preclude continued use and the patient is now being considered for newer IGF-1 antagonists in an attempt to control the presumed IGF-1-driven disease. Clinical and radiological features are presented together with immunohistochemical findings following orbital (lacrimal gland) biopsy.

Conclusion
In existing reports, the eye manifestations of acromegaly have responded to the treatments outlined above. Acromegalic eye disease is a rare or perhaps underdiagnosed condition and assessment of the role of IGF-1 in the orbitopathy of these patients may encourage more research to help understand the role of IGF-1 in Thyroid Eye Disease. In our case, imaging at the outset may have helped to reach an earlier diagnosis, despite the clinical working diagnosis of mild Thyroid Eye Disease.

IGF-1R, CD34 and FOXP3, PPAR-γ expression in the orbital fat/connective tissue of patients with mild and severe Graves' orbitopathy, Poster 11

1Medical Pathomorphology, Cathedral of Biostructure, 2Department of Pediatric Ophthalmology with Strabismus Centre, Medical University of Bialystok, 13 Waszyngtona Str. 17 Waszyngtona Str. Bialystok, 15-245, Poland

Aim
To assess IGF-1R, CD34 and FOXP3, PPAR-γ and immunocompetent cells in the orbital fat/connective tissue of patients with severe and mild (long-lasting) Graves’ orbitopathy to differentiate between they role in the course of disease.

Method
Orbital tissue cryosections from 31 patients with GO undergoing orbital decompression (30 females and 1 male) 1) patients with severe GO (n = 22), mean duration of Thyroid Eye Disease (TED) was 1.2 (SD 1.0); 2) Patients with mild GO (n= 9), and mean duration of TED was 3.3 (SD - 1.9). 10 individuals (9 females and 1 male) undergoing orbital surgery for blepharoplasty. We evaluated the expression of IGF-1R, CD34 and FOXP3, PPAR-γ in the orbital tissue by immunohistochemical staining. In addition, Spearman’s correlation we performed between the expression of the studied parameters and CD4, CD68 and FGFβ, TGFβ.

Result
Increased IGF-1R, CD34 and FOXP3 expression was seen in severe and mild GO vs control. There was a significant correlation between fibrocytes’ markers expression and IGF-1R expression in all examined groups. Increased FGF-β expression was observed in the fibroblasts and adipocytes of the severe GO and TGF-β expression was observed both in the severe and mild GO. Within mild (long-lasting) GO statistical significance was observed between CD34 and CD4, CD68, TGF-β and FGF-β expression. IGF-1R expression correlated negatively only with FGF-β in the mild GO. Whereas, in severe GO subgroup IGF-1R expression correlated with CD4.

Conclusion
Fibrosis in longer-lasting GO is associated with TGF-β and FGF-β expression, which is mediated by T helpers (CD4+), macrophages (CD68+) and CD34 expression. The CD34 expression rather than IGF-1R and FOXP3 can be a marker the orbital tissue remodeling in the course of Graves’ orbitopathy.
CD40 induces an increase of sphingolipids in orbital fibroblasts of Graves’ disease patients, Poster 12

Department of Ophthalmology, University Hospital Essen, Hufelandstrasse 57, Essen, 45147, Germany

Aim
Investigating the role of sphingolipids and CD40 stimulation in Graves orbitopathy.

Method
Orbital fibroblasts (OF) from Graves orbitopathy (GO) patients and healthy control persons were stimulated with CD40 ligand. CD40 receptor expression and signaling was investigated by Western Blot and flow cytometry. Sphingolipids were analyzed by DAG kinase assay, mass spectrometry, ELISA and microscopy.

Result
Acid sphingomyelinase activity (ASM), ceramide, sphingosine and sphingosine 1 phosphate (S1P) was increased in response to CD40 stimulation in GO derived OF compared to controls. Protein expression of ASM and acid ceramidase was unaffected. Using orbita slices from a Graves’ disease mouse model, we demonstrate that S1P is increase in the orbital fat tissue.

Conclusion
These results show for the first time that CD40 ligand stimulated GO orbital fibroblasts react with an increase of the sphingolipids ceramide, sphingosine and S1P. The generated S1P might function as chemoattractant for T-cells increasing inflammation in the orbital fat tissue.

Objective image-based (matlab math works software, MA, USA) analysis of upper eyelid contour and height in an Asian Indian population, Poster 13

S. Rath1(Presenting Author), H. Kaza1, J. N. Sheth1
1 L.V.Prasad Eye Institute, Bhubaneswar, India

Aim
To objectively assess the upper eyelid contour and margin reflex distance1 in normal Asian Indian population and derive a contour ratio.

Method
This was a prospectively designed ethics approved institution based study. Photographs of consenting participants were taken under reproducible standard conditions. Those who had prior surgery of eyelid, history of trauma to the face, or congenital eyelid anomaly were excluded. Eyelid contour was derived after measuring multiple mid-pupillary lid distances (MPLD), each drawn at 15-degree intervals from the pupil to the upper lid margin. The ratio of lateral to medial eyelid MPLDs (contour ratio) and margin reflex distance (MRD1) for all and age and gender groups were derived.

Result
Out of 102 Asian Indian normal participants, 54 (53%) were female. Mean age of the study population was 28.9 years (range 10 to 70 years). A large majority (n=72; 68.6%) were aged between 20–30 years followed by (n=17; 16.6%) in 30-40 years. Mean contour ratios in those two groups were 1.14 and 1.13 respectively. Mean MRD1 for both eyes was calculated to be 4.16 with a SD of 0.87. We found a decline in MRD1 (mean = 3.97mm) with age over 60 years. Mean contour ratio in the population was 1.15 for right and 1.14 for left eye (SD 0.1±0.02, CI 0.08±0.02, p=0.42 using 2-tailed unpaired t-test). We derived a contour ratio range 1.13–1.16 in our population.

Conclusion
Our objective image-based analysis helped us to derive an upper eyelid contour ratio and eyelid height in an Asian Indian population. These may be a useful tool in devising screening strategies for Thyroid Eye Disease and documentation.
Autoantibodies in Graves Orbitopathy, Poster 14
N. Tan, S. M. Young, S. Lim, S. S. Lang, S. Amrith, G. Sundar

Aim
To investigate the association between levels of serum thyroid-stimulating hormone (TSH)-receptor autoantibodies (TRAb), Anti-thyroid peroxidase (anti-TPO), Antithyroglobulin (anti-Tg) and Thyroid Stimulating Immunoglobulin (TSI) antibodies and Graves' orbitopathy (GO) activity and severity.

Method
A cross-sectional study was performed. Medical records of patients diagnosed with GO and seen in our thyroid eye clinics between January 2005 and December 2014 were reviewed retrospectively. GO activity at presentation was assessed by clinical activity score (CAS) and severity graded as mild, moderate or severe.

Result
There were a total of 362 patients, 126 (34.8%) were male, and mean age was 40.7 ± 15.7 years. Smokers (active and passive) comprised 34.8% (n=126). 112 (30.9%) had positive family history of Thyroid disorders. Median and mean interval from diagnosis of Thyroid disorder to GO was 4 and 11.9 months respectively. Median and mean CAS score was 2 and 2.1 respectively. In terms of severity, 262 (72.4%) had mild disease, 72 (19.9%) moderate, and 28 (7.7%) severe. Spearman’s rank correlation was used to assess for any significant relation between autoantibodies and patients’ CAS and severity. Severity (R=0.187, p=0.041) was found to be significantly correlated with TRAb but not with other autoantibodies. No correlation was found for CAS and TRAb (p=0.077), Anti-TPO (p=0.867), Anti-Tg (p=0.242) and TSI (p=0.454). Non-parametric analysis also found no significant relation between proptosis, motility limitation, and optic neuropathy.

Conclusion
Our study shows that only TRAb appears to have a positive correlation with GO severity. Other autoantibodies do not appear to be significantly correlated to clinical activity, severity, proptosis, myopathy and neuropathy in GO, making this heterogeneous disease even more difficult to predict and manage.

Radiological signs in Thyroid Eye Disease – What’s new, Poster 15
N. Tan, S. M.Young, M. H. Zin, S. S. Lang, S. Amrith, G. Sundar

Aim
1) To establish if there is any increase in the angle of the inferomedial strut (AIOS), possibly due to chronic remodelling from increased intraorbital pressure in Thyroid Eye Disease (TED).
2) To describe the range of thickness of the deep lateral wall.

Method
We retrospectively reviewed the computer tomography (CT) scans of 22 consecutive TED patients with proptosis of both eyes, and 20 consecutive controls. The AIOS was measured at three points on the coronal planes: anterior (first cut just posterior to the lacrimal sac), posterior (the last cut posteriorly where angle between orbital floor and medial wall can still be reliably measured near the apex), and middle (halfway between the anterior and posterior cuts). The thickness of the deep lateral wall was the horizontal distance between the vertical midpoint of the lateral orbital wall and the edge of the greater wing of sphenoid, at a point just anterior to the temporal bone, on coronal planes.

Result
The mean AIOS for anterior, mid and posterior points for TED patients were 138.00±6.55, 136.17±12.32 and 139.16±10.85 degrees respectively, while that for the controls were 135.89±9.49, 130.20±10.99 and 137.75±5.39 degrees respectively. The angles were larger for TED patients at all points although none of the differences between TED and controls reached statistical significance: anterior (p=0.401), mid (p=0.107), posterior (p=0.603). The deep lateral wall thickness for TED patients ranged from 7.66 to 19.72mm.

Conclusion
1) Our clinical observation that TED patients with proptosis (and increased volume of orbital tissues) have an increased AIOS compared to controls was not demonstrated with statistical significance in this study despite all values of AIOS being larger in the former group –however, this possibly be due to the small sample size, and thus would benefit from further study.
2) Determining the exact anatomic location and volume of the thickest section of the greater wing of the sphenoid bone (trigone), which is removed during deep lateral orbital wall decompression is important for surgical planning. The high intersubject variability underscores the need for individualized preoperative analysis by imaging studies and suggest that lateral wall decompression may be suitable for some patients over others.
The effect of (-)-epigallocatechin-3-gallate on IL-1β-induced IL-8 expression in orbital fibroblast from patients with thyroid-associated ophthalmopathy, Poster 16
S. Yang1, J. Paik1, S. Lee2, S. H. Park1
1 Department of Ophthalmology and Visual Science, 2 Department of Pathology, 1 Seoul St. Mary’s Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea, 2 College of Medicine, The Catholic University of Korea, Seoul, Korea, Seoul St. Mary’s Hospital, The Catholic University of Korea, Seoul, Korea, 222 Banpo-daero, Seocho-Gu, Seoul 137-701, Republic of Korea, Seoul, 137-701, Republic of Korea

Aim
Orbital fibroblasts have been reported to be an important effector cells for the development of thyroid-associated ophthalmopathy (TAO). Orbital fibroblasts secrete various inflammatory cytokines in response to an inflammatory stimulation, leading to TAO-related tissue swelling. It has also been reported that (-)-epigallocatechin-3-gallate (EGCG), a major polyphenolic constituent of green tea, has antioxidant and anti-inflammatory properties. In the current study, we investigated the issue of whether or how EGCG affects the interleukin(IL)-1β-induced secretion of IL-8 in human orbital fibroblasts from TAO patients.

Method
Human orbital fibroblasts were collected from the orbital fat obtained from patients with TAO who had undergone decompression surgery. The levels of IL-1β-induced secretion of IL-6 and IL-8 in orbital fibroblast, pre-treated with EGCG, was examined by estimation of protein using ELISA and estimation of mRNA using quantitative real-time RT-PCR. Degradation of IκBα, and the phosphorylation of p38 and ERK was examined using Western blot analysis.

Result
Treatment with EGCG significantly reduced the level of IL-1β-induced secretion of IL-8 and the expression of IL-8 mRNA. IL-1β-induced the degradation of IκBα, and the phosphorylation of p38 and ERK, and the IL-1β-induced expression of IL-8 mRNA was inhibited by specific inhibitors, such as BAY-117085 for NF-κB, SB203580 for p38, and PD98059 for ERK. In addition, treatment with EGCG inhibited the IL-1β-induced degradation of IκBα, and the phosphorylation of p38 and ERK. However, pre-treatment with antioxidants, NVN and NAC, which suppressed ROS generation, did not reduce IL-8 expression in IL-1β-treated orbital fibroblasts.

Conclusion
EGCG suppresses the IL-1β-induced expression of IL-8 through inhibition of the NF-κB, p38, and ERK pathways. These findings could contribute to the development of new types of EGCG-containing pharmacological agents for use in the treatment of TAO.

Multi-wall orbital decompression for disfiguring proptosis in patients with mild or moderate Graves’ ophthalmology, Poster 17
W. Yi, X. Lihua
Institute of orbital diseases, the General Hospital of the Armed Police Force, No.69 Yongduling Road, Haidian District, Beijing, 100039, China

Aim
To evaluate the utility of orbital decompression by transconjunctival medial and inferior wall combined transpalpebral lateral wall for disfiguring proptosis with mild or moderate Graves’ ophthalmopathy.

Method
A retrospective review of 18 cases (28 orbits) between Dec 2013 and Dec 2015 at the Institute of Orbital Diseases of the General Hospital of the Armed Police were conducted. Operation purpose was to improve remarkable proptosis, widen eyelid fissure, and swollen eyelid. Including criteria: 1, Hertel value was 14-23mm or over 2-7mm than contralateral eye; 2, Orbital pathy has been inactive with normal thyroid function for at least 6 months; 3, Orbital pressure is normal or (+). Clinical outcomes were recorded including best-corrected visual acuity, exophthalmometry, margin-to-central distance of upper and lower lids, diplopia, and CT scans before and 3 months after surgery.

Result
The mean protosis of pre- and postoperation were 19.2±2.3mm and 14.7±1.4mm with mean reduction was 4.6±1.7mm (P<0.01). Margin-to-central distance of the upper lid of pre- and postoperation were 5.1±1.2mm and 4.9±1.3mm with mean reduction was 0.2±0.5mm (P =0.095). Margin-to-central distance of the lower lid of pre- and postoperation were 5.9±0.9mm and 4.3±0.7mm with mean reduction was 1.6±0.8mm (P<0.01). The difference of bilateral exophthalmos after surgery is 0-2.5mm (median=1mm). None has new-onset diplopia at primary gaze and at surrounding gaze in two (11.1%) cases (P>0.01). Two patients (11.1%) had relief of diplopia postoperatively.

Conclusion
Transconjunctival and transpalpebral medial, inferior, and lateral walls decompression with a hidden incision has proved to be a controllable, safe, effective technique with minimal morbidity and could achieve an improvement not only mild, moderate proptosis, but also retraction of lower lid, and swollen eyelids.
Novel radiological parameters in Thyroid Eye Disease (TED), Poster 18
N. Tan, S. M. Young, M. H. Zin, H. H. Oo, G. Sundar

Aim
To evaluate the following radiological parameters in Thyroid Eye Disease (TED): 1) angle of inferomedial orbital strut (AIOS) and 2) variation in deep lateral wall thickness, 3) medial wall convexity.

Method
Comparative study of computer tomography (CT) face scans between 152 TED patients and 150 age-matched normals.

Result
The mean (AIOS) for anterior, mid and posterior points for TED patients were 138.0, 136.2 and 139.2 degrees respectively, while that for normals were 135.9, 130.2 and 137.8 degrees respectively. The angles were significantly larger in TED patients for the mid (p=0.247) and posterior (p=0.01) AIOS. The deep lateral wall thickness for TED patients ranged from 7.66 to 19.72mm. Patients with significant medial wall/floor convexity were much younger with greater tendency for compressive optic neuropathy.

Conclusion
The trend of an increased AIOS in TED patients supports the proposed chronic remodeling model of TED process to the orbital walls. The high intersubject variability of the deep lateral wall underscores the need for individualized preoperative analysis. Determination of floor/medial wall convexity may represent a high risk factor for compressive optic neuropathy.
Radiological profile of Thyroid Eye Disease (TED) decompression patients, Poster 19

G. Sundar, S. M. Young

Aim
To evaluate relevant radiological parameters in patients with Thyroid Eye Disease (TED) pre- and post-surgical decompression.

Method
Retrospective review of demographics and radiological studies in TED patients who had undergone surgical decompression from 2010-2015.

Result
Of 24 patients, 58.3% were female, mean age was 45.3 years. Indications for surgery: proptosis (66.7%), preparation for strabismus surgery (29.2%), dysthyroid optic neuropathy (20.8%). Fat stranding was seen in 20.8%, apical crowding in 79.1%. Decompression surgery: One-wall and fat (33.3%), two-wall and fat (58.3%), three-wall and fat (8.3%). The orbital strut was violated in 12 patients to secure maximal decompression, of whom 10 had pre-existing diplopia. Posteromedial bulge was decompressed in 66.7% and lateral wall decompressed in 71.4%. Factors for under-decompression: early cases, no intraoperative ‘navigation’.

Conclusion
Thyroid Eye Disease has much inter-subject variability. Surgical decompression for TED should be tailored based on indication and radiological characteristics. Results are enhanced with use of intraoperative navigation. Preserving the orbital strut is important to avoid postoperative diplopia. Apical crowding may be seen in patients without optic neuropathy.
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