Mini-me?  
We shall see

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Objective: Delivering effective eyewear to all children

- Regular eye examination
- Prescription/intervention
- Activity/Environment
- Compliance
- Fit
Why is achieving a good fit a challenge?

What is on offer?

Fashion/branded

Confidence/experience

Adaptation skills
Frame criteria

- The frame must fit the child’s anatomical features
- The frame must be safe, comfortable and durable
- The frame must hold the lenses at the correct position
- The frame must not hamper the anatomical development of the face
- The frame must be desirable!!
Frame and Facial Measurements
Boxed Lens Size and DBL

Distance Between Centres = HLS + DBL
Pupillary Distance
Bridge Height

Take vertical scale reading from BWL or HCL and add 5 mm
Crest Height
Apical radius
Distance Between Rims at 10/15mm below the crest
Bridge Projection

Projection = 4 mm
Bridge Projection
Head Width

Head Width = 120 mm
Head Width
Temple Width

Temple Width = 130 mm
Frontal Angle
Splay Angle of Pad

Normal to Front
Splay Angle
Pantoscopic and LTB
Angle of side

- Line of side
- Normal to back plane of front
- $5^\circ$
Length to Bend

Dowel point to ear point
Downward angle of drop

Angle = 50°
Facial Development
<table>
<thead>
<tr>
<th>Age years</th>
<th>3-4.5</th>
<th>4.5-6</th>
<th>6.5-8.5</th>
<th>10-11.5</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crest height mm</td>
<td>-0.8</td>
<td>-0.5</td>
<td>+0.5</td>
<td>+2.4</td>
<td>+4.5</td>
</tr>
<tr>
<td>Projection mm</td>
<td>+0.2</td>
<td>+1.0</td>
<td>+1.4</td>
<td>+1.6</td>
<td>+3.0</td>
</tr>
<tr>
<td>Frontal Angle (degrees)</td>
<td>34</td>
<td>34</td>
<td>32</td>
<td>31</td>
<td>30</td>
</tr>
<tr>
<td>Splay Angle (degrees)</td>
<td>35</td>
<td>34</td>
<td>32</td>
<td>29</td>
<td>29</td>
</tr>
</tbody>
</table>
Facial measurement differences and frame design

The crest height is ........ lower/higher
The frontal angle is ........ smaller/larger
The splay angle is ........ smaller/larger

The boxed lens size will be smaller but the DBL needs to be wider
The lens aperture must have a shape that fits the features
The length to bend and the length of drop will be relatively shorter
The vertex distance is often very short
We are all different.....
For Afro-Caribbean children, the typical differences are:

- Crest height -2 mm
- Projection -1 mm
- Frontal angle +7 degrees
- Splay angle +9 degrees
For children with Down’s syndrome, the facial characteristics are as follows:

- Crest is more negative.
- Frontal angle is smaller in comparison.
- Splay angle is larger in comparison.
- Apical radius smaller.
- Front to bend shorter.
- Temple width larger in comparison.
- Head width larger than expected in younger children, but smaller in older children.
- Interpupillary distance is smaller in older children.
<table>
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<td>+1.6</td>
</tr>
<tr>
<td>Frontal Angle (degrees)</td>
<td>34</td>
<td>34</td>
<td>32</td>
<td><strong>26.3</strong></td>
<td>31</td>
</tr>
<tr>
<td>Splay Angle (degrees)</td>
<td>35</td>
<td>34</td>
<td>32</td>
<td><strong>33.8</strong></td>
<td>29</td>
</tr>
</tbody>
</table>

Facial parameters of normally-developed children

Facial parameters of children with Down’s syndrome
Measuring children......
Measuring children......
Take 3D images of children from 0-16

Place landmarks to analyse the images and obtain meaningful data from linear and angular measurements

Look for trends in growth patterns, differences in ethnicities, gender differences etc

Track growth over a period of time

Advise frame manufacturers with evidence-based parameters

For children wearing spectacles, ray trace the effective power in the ‘as-worn’ position compared to the prescription
Lens criteria

Comfort – weight, edge
Safety – material, edge
Cosmesis – thickness, decentration, form, blank size

Performance
• Vertex Distance
• Visual performance in the periphery
• Lens form and visual performance
• Blank size
Vertex Distance

Increasing (due to slippage) by 10mm
+6.00D
What would effective power be?

To retain the +6.00D, a +5.66D would need to be ordered

\[ F(\text{new}) = F(\text{old}) \]
\[ \frac{1}{1+(dF(\text{old}))} \]
+where increase in vertex distance d is difference in metres

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Astigmatic Error

Oblique Refraction Creating Astigmatic Error
## Lens Form and Performance

### -10.00DS

<table>
<thead>
<tr>
<th>+2.00 base</th>
<th>OAE</th>
<th>MOE</th>
<th>DIST</th>
<th>OAE</th>
<th>MOE</th>
<th>DIST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10°</strong></td>
<td>-0.01</td>
<td>+0.02</td>
<td>0.9%</td>
<td>-0.07</td>
<td>-0.04</td>
<td>1.1%</td>
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<tr>
<td><strong>20°</strong></td>
<td>-0.03</td>
<td>+0.09</td>
<td>4.3%</td>
<td>-0.28</td>
<td>-0.15</td>
<td>5.0%</td>
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<tr>
<td><strong>30°</strong></td>
<td>+0.01</td>
<td>+0.28</td>
<td>11.3%</td>
<td>-0.61</td>
<td>-0.32</td>
<td>13.5%</td>
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<tr>
<td><strong>40°</strong></td>
<td>+0.23</td>
<td>+0.70</td>
<td>25.2%</td>
<td>-1.03</td>
<td>-0.51</td>
<td>32.2%</td>
</tr>
</tbody>
</table>
Blank sizes - does it matter?

Centre thickness comparison (t) in positive power lenses. Values in mm

<table>
<thead>
<tr>
<th></th>
<th>Blank</th>
<th>+2.00</th>
<th>+4.00</th>
<th>+6.00</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65</td>
<td>3.4</td>
<td>5.4</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>2.5</td>
<td>4.0</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>2.3</td>
<td>3.4</td>
<td>4.5</td>
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</table>
What can we do now?

Frames

Scrutinise your frame range

Look at features before buying

Eye shape, bridge position and type, side type and length, joints

Adjustability of sides, bridges, lugs etc

Feedback to reps/ buyers

Have a look at specialists suppliers

Educate parents/children

Order in on approval
What can we do now?

Fitting

Alter bridges, cut down sides, fit curls
Remember the fitting triangle

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Downward angle, inward angle and lengths of side and drop
What can we do now?

Lenses

Try to minimise decentration by selecting matching frame HCD
Offer higher impact-resistance lenses
Order MSU
Offer aspheric/high index/MAR if beneficial
Be aware of edge thickness at bridge – fitting implications
Safety champher
What can we do now?
The child’s journey

Environment
Communication skills
Frame selection procedure
Attention span

Measurement considerations

Advice on wear/care
Rewards
Education

Practice building
Thank you for your kind attention
Any questions?

References