



Biomechanical Assessment of the 3-Point Force System in the Orthotic Management of Scoliosis in the Non-Ambulant Spastic Cerebral Palsy Population

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Aims of Study

- Scoliosis progresses
- Seating improves posture & provides support
- Lateral supports - how should they be used?
- Lack of research
- Investigate effects of seating

Equipment



Caps II seating system

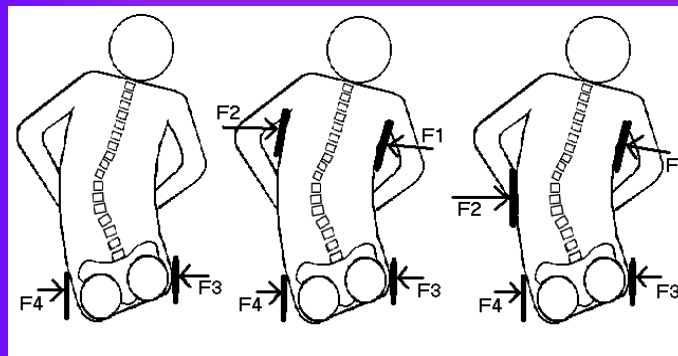


Assessment chair

Subjects

- Pupils at local schools
- Cerebral Palsy
- Skin markers placed
- Positioned in assessment chair
- Spine shape measured
- Forces exerted on the subject by chair measured

Configurations



Configuration 1:

upper body
unsupported

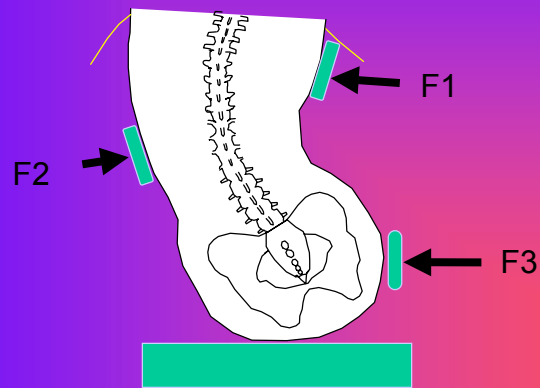
Configuration 2:

Lateral thoracic pads
at same height

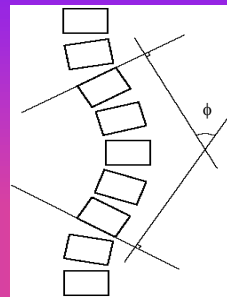
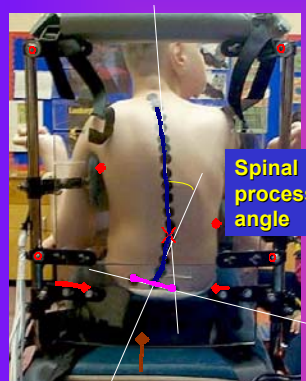
Configuration 3:

3-point force
system

3-point force system

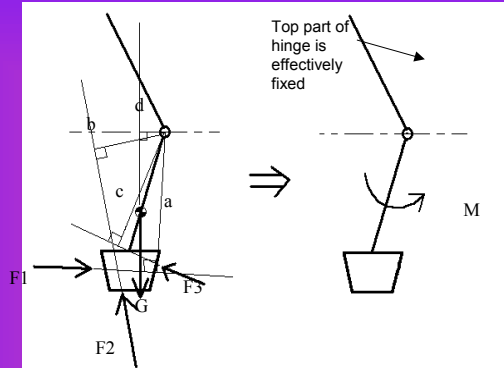
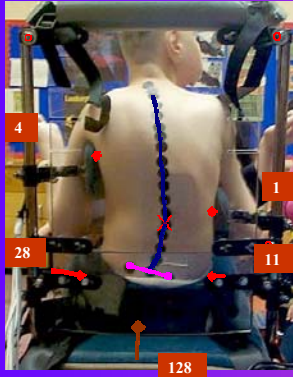


1. Spinous process angle measurement



The Cobb angle measured on an X-ray

2. Coronal Force Measurement



Results

- Configuration 3: correction of +35% ($P=0.000$) Forces similar (51N/47N)
- Configuration 2: correction only +18% ($P=0.004$), higher force on concave pad
- Not at expense of pelvic obliquity

Conclusion

Significant static correction of a scoliotic spine can be achieved with the lateral pads on a seating system applying a 3-point force to the sides of the body.

Implications

- Position of lateral pads important
- Use of equipment for assessment and fitting of special seating
- Important for designers of special seating

Thanks to . . .

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