Orthotic Treatment of a Complex Partial Foot: A Case Study

Kirsty Green, Senior Orthotist, NHS Greater Glasgow and Clyde

Background

Congenital lower limb deficiencies at birth are uncommon, affecting 2 in 10,000 children in the US (Le and Scott-Wyard, 2015). Longitudinal deficiencies are the most common however there are many different presentations and therefore each patient requires an individual approach. Orthotic treatment options focus on replacing biomechanical deficits and redistributing pressure over bony prominences. This can be in the form of footwear adaptations, insoles and more supportive options such as ankle foot orthosis (AFO) depending on the level of deficit (Janisse and Janisse, 2008)

Patient Presentation

- 17 Year–old female
- Right congenital partial foot and hand
- Previous orthosis chewed by her dog
- Works as a dog walker
- Wants to be able to wear preferred footwear (converse style high-top trainer)

Patient Assessment

- A full clinical assessment was conducted
- Key points:
  - right leg 30mm shorter
  - partial foot was approximately Lisfranc length
  - 5° dorsiflexion, 20° plantarflexion, limited inversion and eversion
  - All muscle strengths of 5 on MRC oxford scale
  - callousing to distal ends of foot
  - Gait: uneven step length, loss of third rocker, right hip dropping during stance

Goals

Patient: to have a comfortable orthosis. Clinical: allow wearing of shop bought footwear and improve propulsion.

Treatment Option 1

- Jointed ankle foot orthosis (AFO)
- Allows ankle movement to use muscle strength
- Sole plate extended to length of contralateral side to create more even step length
- Toe filler to reduce collapse of footwear
- Total contact insole to redistribute pressure
- Internal heel wedge to accommodate leg length discrepancy
- Standard AFO cast shape capture (deltacast with anterior shin tube)

Results

- Found it too bulky
- Did not like the movement at her ankle

Treatment Option 2

- Internal total contact insole wrapped in homopolymer to create rear entry type boot
- Pitch to accommodate leg length discrepancy
- Very little adjustment but neater
- Manufacturer guidance sought on shape capture and cast taken using traditional plaster and posterior tube

Results

- A comfortable orthosis she was able to wear for work and with her preferred footwear

Discussion and Conclusion

Working with patients, especially long-standing complex patients, is a shared decision-making process with the patient and its important they are at the centre of their care. (Calderwood, C, 2017) Although our first attempt at something different was not successful she was happy to have tried this and now knows this is not an option for her. We would not have been able to make her orthosis without support from our manufacturer to advise on what shape capture processes would work best and what was achievable therefore it required team working from multiple people to achieve a successful outcome.

References

Calderwood, C. (2017) Realising Realistic Medicine: Chief Medical Officer for Scotland annual report 2015-2016. Edinburgh: The Scottish Government.

Janisse, D.J. and Janisse, E. (2008) 'Shoe Modification and the Use of Orthoses in the Treatment of Foot and Ankle Pathology', Journal of the American Academy of Orthopaedic Surgeons, 16(3), pp. 152–158. Available at: https://doi.org/10.5435/00124635-200803000-00006.

Le, J.T. and Scott-Wyard, P.R. (2015) 'Pediatric Limb Differences and Amputations', Physical medicine and rehabilitation clinics of North America, 26(1), pp. 95–108. Available at: https://doi.org/10.1016/j.pmr.2014.09.006.

Acknowledgements

- Medical illustrations and Ailidh Beaton for photos
- Renace for manufacture and support
- Laura Barr and Gail Morrison for proof reading