An Overview of Custom Contoured Seating (CCS) Provision in the NHS Grampian Wheelchair Service

Katie Henderson, NHS Grampian

Summary
Custom Contoured Seating (CCS) can be costly to a Wheelchair Service in both time and expense. This audit highlighted a role for CCS use in managing the impact of moderate/severe neuromuscular deformity (NMD), or mild NMD with significant tonal abnormality, on the seated position. Through CCS use improvements in functional, comfort and skin integrity goals were observed.

Aims
CCS is often used in wheelchair seating as a solution when modular systems are either inadequate or ineffective in meeting the user's needs (Pope, 2007). Evidence to support its use, however, is limited (Osbourne et al, 2023; Hosking, 2023).

In NHS Grampian CCS is supplied to 1% of wheelchair users, but utilises 12% of the non-pay budget. This audit aimed to review the current CCS service to evaluate its role in terms of patient selection, outcome success and long-term effectiveness.

Objectives

1. To identify the goals of CCS, and whether these have been achieved.
2. To evaluate the relationship between the severity and scope of NMD, and the seating problems identified.
3. To evaluate the impact of tonal presentations on CCS provision

Background
101 patients (adult and paediatric) issued with CCS between 2017 and 2024 were identified and their wheelchair notes retrospectively analysed in terms of CCS goals, postural presentations, and outcome of interventions.

Results
Goals
Improving the seated posture was the main goal raised (90%), however it was rarely the only concern. For the vast majority it was a combination of functional improvements (47%), managing skin integrity (41%), and seating tolerance (56%) that were the primary goals.

Postural presentations
92% of patients had one or more moderate to severe fixed contractures preventing them from achieving normal anatomical sitting (as defined by Pope et al, 2013).

All patients who were falling/leaning to the side had a fixed coronal or transverse limitation in the pelvis and/or spine, or an asymmetrical limitation in hip range. Similarly, all those who fell forwards in their trunk, had a fixed moderate/severe enhanced kyphosis or posterior rib prominence. 78% of those who presented with sliding forwards in the chair, or desired a functional upright posture, had fixed limitations in their hip flexion range.

Tone
In addition to the severity of deformity, there were patients who presented with mild limitations yet were still requiring CCS. This audit identified that such patients either had

extremely low truncal tone or severe high tone presentations (spastic or dystonic). The low truncal tone population were predominantly people with advanced MS, over half of whom also had an implanted ITB device.

Goal attainment

Short-term outcome

Of those who had taken delivery of their CCS at the time of this audit, 67% reported short-term resolution of their goals. A further 27% required some additional in-house modification to achieve their goals. 3% required more substantial changes, some of which required re-casting. The remainder were unresolved or died before completion.

Long-term outcome

Of the 101 patients who were issued with CCS between 2017 and 2024, eighteen are now deceased. Of the remaining 83 patients, 68% still have their original CCS in use. 35 patients have required a new or replacement CCS. The main reason has been a general move to using carved foam instead of thermoplastic materials, however issues such as growth, disease progression and postural interventions (ITB/orthopaedic surgery) have also necessitated a new seat. Only four patients have stopped using CCS.

Discussion

A series of recent systematic reviews have concluded that there are immediate effects of adaptive seating in improving postural alignment (Toohey et al, 2024; Acharya et al, 2023; Hosking, 2023); however, the evidence is limited in their long-term benefits in prevention of NMD. These studies did, however, observe a potential theme of improvement of functional goals with CCS use.

This audit evidences that CCS plays a role in managing the consequences of moderate to severe NMD on effective seating. There is also evidence that supports CCS use with challenging tonal presentations, stabilising the seated position and reducing equipment failure. Through identification of key postural limitations, and subsequent moulding of a patient in relation to these, this audit demonstrated goals of increased seating tolerance, reducing focal pressure areas, and optimisation of function can be achieved.

These functional benefits are also seen in the longer term with 96% of people in this audit still using CCS to manage their wheelchair needs. This supports previous observations of high patient and carer satisfaction (Hosking, 2023), and improved quality of life indicators (Neilson et al, 2001) with CCS use.

References

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Email: katie.henderson@nhs.scot