Implementation of the BOOST programme in routine NHS practice

Background

BOOST is a 12-week, group-based education and exercise programme informed by cognitive-behavioural approach for older people with lumbar spinal stenosis. When compared to best practice advice in a large randomised controlled trial (RCT), the BOOST programme significantly improved walking at six and 12 months, reduced the risk of falling, and was cost-effective. This implementation work aimed to optimise the BOOST programme, develop and assess the BOOST online course, evaluate clinical outcomes in patients, and understand the experiences BOOST programme providers (physiotherapists and exercise instructors) in delivering the programme.

Methods

Stage 1: The programme was optimised using RCT data, and input from a community of practice involving physiotherapists, patient representatives, NHS managers, and clinical experts (n=30). The optimised programme was evaluated in 31 patients across four NHS sites (Cohort 1) and delivered by physiotherapists and exercise instructors who attended BOOST face-to-face training.

Stage 2: The face-to-face training was adapted to an online format on FutureLearn platform, followed by an impact evaluation. The programme was then evaluated in 74 patients across nine NHS sites (Cohort 2), delivered by physiotherapists who had completed the online course. Additionally, online interviews were conducted with physiotherapists and exercise instructors who delivered the programme.

Results

The key changes to the BOOST programme are outlined in **Table 1**. Thirty-one participants (28 physiotherapists and 3 level 4 exercise instructors) enrolled in the online course, with 24 (77%) completing it. At the end of the training, all participants reported being satisfied, confident, and capable of delivering the programme, with 87.5% intending to use it in clinical practice. At the six-month follow-up, 19 participants (61%) provided feedback. Of these, 55% reported delivering the programme and 22% reported using specific elements. Most participants found the programme useful and intended to continue using it, though some anticipated barriers such as time constraints and lack of funding support.

Demographics of patients are presented in **Table 2** and clinical outcomes are detailed in **Table 3**. At six months, patients showed greater improvements (2.8 times) in walking ability, compared to the RCT. Improvements in overall ODI were also better. Changes in ODI items of standing, walking, and pain intensity, and quality of life outcomes were slightly bigger in magnitude than those observed in the BOOST RCT but did not reach statistical significance. The small improvements in individual ODI items likely contributed to the greater improvements in total ODI. Satisfaction with symptom changes was very similar to the BOOST RCT with 17/31 patients (55%) in Cohort 1 and 34/74 patients (46%) in Cohort 2 reporting satisfaction, compared to 51% in the RCT. Adverse events were minimal (n=3, e.g. increased back pain), similar to the RCT. Exercise engagement post-programme was lower with 17/31 patients (55%) in Cohort 1, and 30/74 patients (41%) in Cohort 2 reported exercising at least two days a week, compared to 73.9% in the RCT.

Facilitators of implementation included managerial support, patient feedback, BOOST materials, and the online course. Printing costs, staff shortages, and lack of exercise space were a few common barriers. While some sites have planned to continue delivering the programme as is, others reported requiring adaptations to suit their services.

Conclusions

We successfully trained physiotherapists to deliver the BOOST programme using an online course. The changes to the BOOST programme were worthwhile and resulted in substantial improvements in walking and disability compared to the original programme and it was implementable in the NHS. The online course is now available worldwide for health professionals treating older people with lumbar spinal stenosis https://learn.exeter.ac.uk/course/view.php?id=83.

Table 1. Optimisations made in the BOOST programme

Feedback from CoP	Optimisations made in the BOOST programme
1. In the original programme, the groups were delivered twice a week for the first 3 weeks, then once a week for 3 weeks, then once a fortnight for the final 6 weeks. This type of scheduling was challenging to implement in regular physiotherapy practice	Group sessions will be delivered once a week
2. Due to delivering the group weekly, it would be helpful if patients started their home exercise earlier to target the recommended 2 x week strength training	Home exercise was introduced in week 3 instead of week 5
3. CoP indicated that pain education was quite didactic and there were too many metaphors used. They felt more education about medication would be helpful including ensuring patients were aware that they can review their medication with a clinical pharmacist, they do not need to see their GP	Pain education content was modified with reduced number of metaphors. A pain education video was produced working with a clinical pharmacist.
4. BOOST data showed that participants had difficulty with lifting and standing at all timepoints. No improvements were observed at follow up. It was felt these activities were sufficiently addressed in the original programme.	Two new exercises to target lifting and standing strength were included: upper quadrant exercise in standing and weighted lumbar spine flexion.
5. BOOST data showed little change in balance scores at follow up. Many participants had reasonable balance at baseline, so it was suggested that the exercises were not sufficiently challenging and therefore, we added further progressions to the balance exercises to make them harder.	Additional difficulty for the balance exercises. (building up hold time, repetitions, using weights) were added.
6. Ways to encourage ongoing exercise and physical activity were discussed. It was suggested that introducing opportunities for ongoing exercise should be introduced earlier including how to access exercise and physical activity opportunities in their local communities. This would allow therapists to support and encourage patients to seek out and try community-based activities while attending the groups so they could problem solve any barriers to engagement.	Education on independent exercise and opportunities to exercise in their local community were introduced earlier in the discussion sessions.
7. Reduce the amount of paperwork completed during the individual session allowing more time to prepare the patient for the group programme.	The paperwork for the individual session was reduced.
8. Make more time during the individual session so patients can read the background information about LSS, and to practice/use the flexion exercises for pain relief so participant could use them waiting for the group sessions to start.	Patients received the BOOST information booklet and were taught the flexion exercises in the individual session.
9. Ways to help patients engage with community activities was discussed. The CoP suggested we provide a business card to increase patients' confidence when engaging with activity providers in the community. The card can be shown to an activity provider and tells them about NC and details the patients specific exercise recommendations. Patient feedback about the business card was very positive.	Patients were provided with a 'business card' with information about their condition and exercise recommendations.
10. Speaking to patients, they would have like to be able to record their exercise completion and see progress over time. This would encourage exercise adherence and motivation. The CoP also asked if patient materials could be available digitally.	Exercise diaries were added to the patient information booklet. A digital version of the booklet was made available.

BOOST: Better Outcomes for Older people with Spinal Trouble

Table 2. Characteristics of patients in BOOST implementation evaluation

Variables n (%), total, unless stated otherwise.	**Cohort 1 (n=31)**	**Cohort 2 (n=74)**
Age (years) at baseline, Mean (SD), n	77.2 (6), 31	73.7 (5.8), 74
Female	13 (41.9), 31	42 (56.8), 74
White ethnicity	30 (100), 30	74 (100), 74
Married/civil union/cohabiting	22 (71), 31	50 (67.6), 74
Unmarried/separated/divorced	2 (6.5), 31	8 (10.8), 74
Widow/widower	7 (22.6), 31	16 (21.6), 74
Has an unpaid carer	2 (6.5), 31	17 (23), 74
Has a paid carer	3 (9.7), 31	3 (4.1), 74
Retired	27 (87.1), 31	67 (90.5), 74
Working (full or part-time)	3 (9.7), 31	5 (6.8), 74
None or primary education	4 (12.9), 31	1 (1.4), 74
Secondary education	15 (48.4), 31	42 (56.8), 74
Higher professional/university education	12 (38.7), 31	31 (41.9), 74
Median comorbidities (Interquartile range), n	2 (1 to 3), 31	2 (2 to 3), 74
No pain	0 (0), 30	0 (0), 74
Single-site pain	2 (6.7), 30	4 (5.4), 74
Multisite pain	28 (93.3), 30	69 (93.2), 74

BOOST: Better Outcomes for Older people with Spinal Trouble; SD: Standard Deviation

Table 3. Clinical outcomes compared to BOOST randomised controlled trial

Outcomes	Synthetic control (from BOOST RCT)	Cohort 1	Cohort 2	Cohorts combined	Cohort 1* n Between group difference (95% CI) *p* value	Cohort 2* n Between group difference (95% CI) *p* value	Combined* n Between group difference (95% CI) *p* value	BOOST RCT n Between group difference (95% CI) *p* value
Six-minute Walk test (metres)					n=23 61.49 (33.63, 89.36) <0.001	n=55 63.49 (36.29, 90.69) <0.001	n=78 64.85** (42.21, 87.49) <0.001	n=383 22.5 (7.11, 37.82) 0.004
Baseline (n = 248) 6-m follow up (n = 196)	260 (101) 266 (103)	263 (107) 347 (118)	268 (92) 339 (105)	266 (96) 342 (108)				
ODI overall (0 - 100)					n=25 -5.5 (-9.28, -1.72) 0.005	n=59 -2.24 (-6.00, 1.52) 0.241	n=84 -4.65*** (-7.78, -1.53) 0.004	n=383 -3.7 (-6.27, -1.06) 0.006
Baseline (n = 248) 6-m follow up (n = 209)	32.3 (14.2) 33.3 (15.9)	34.3 (13.4) 28.2 (13.3)	33.4 (14.0) 29.6 (15.4)	33.0 (13.8) 29.2 (14.7)				
ODI walking (0 - 5)					n=25 -0.43 (-0.77, -0.10) 0.01	n=59 -0.06 (-0.40, 0.27) 0.72	n=84 -0.24 (-0.52, 0.05) 0.1	n=383 -0.2 (-0.44, -0.02) 0.033
Baseline (n = 247) 6-m follow up (n = 209)	1.80 (1.22) 1.79 (1.33)	1.71 (1.16) 1.24 (1.16)	1.81 (1.23) 1.61 (1.33)	1.78 (1.21) 1.50 (1.28)				
ODI pain intensity (0 - 5)					n=25 -0.18 (-0.52, 0.15) 0.27	n=58 -0.38 (-0.71, -0.05) 0.03	n=83 -0.34 (-0.61, -0.08) 0.01	-0.28 (-0.50, -0.05)
Baseline (n = 248) 6-m follow up (n = 208)	1.59 (1.05) 1.82 (1.15)	1.65 (0.98) 1.56 (0.96)	1.66 (0.83) 1.47 (0.99)	1.66 (0.88) 1.49 (0.98)				
ODI standing (0 - 5)					n=25 0.02 (-0.33, 0.37) 0.9	n=59 0.11 (-0.24, 0.45) 0.6	n=84 0.06 (-0.24, 0.36) 0.7	0.03 (-0.20, 0.26)
Baseline (n = 248) 6-m follow up (n = 209)	2.72 (1.28) 2.55 (1.38)	3.13 (1.02) 2.76 (1.16)	2.62 (1.36) 2.54 (1.26)	2.77 (1.29) 2.61 (1.23)				
EQ-5D (0 - 5)					n=25 0.05 (-0.00, 0.09) 0.07	n=58 0.02 (-0.03, 0.07) 0.41	n=83 0.04 (-0.01, 0.08) 0.09	0.021 (0 to 0.044)
Baseline (n = 248) 6-m follow up (n = 208)	0.58 (0.20) 0.59 (0.21)	0.54 (0.22) 0.64 (0.20)	0.59 (0.17) 0.64 (0.19)	0.57 (0.19) 0.64 (0.19)				

BOOST: Better Outcomes for Older people with Spinal Trouble; CI: Confidence Interval; EQ-5D: European Quality of Life Questionnaire; ODI: Oswestry Disability Index; RCT: Randomised Controlled Trial

* Synthetic control as comparator

**A difference of 50m is clinically meaningful

***A difference of 5 points is clinically meaningful