Technoleg Iechyd Cymru
Health Technology Wales

Topic Exploration Report [1]

Static progressive stretch orthoses for postoperative knee stiffness and arthrofibrosis

What is a Topic Exploration Report?

Topic Exploration Reports are not health technology assessments. These reports provide a high-level briefing on new topics submitted to Health Technology Wales and are not based on exhaustive or systematic literature searches. Instead, they rely on a focussed scan of key resources.

What evidence is used in a Topic Exploration Report?

Priority is given to summarising the most relevant or useful evidence, rather than covering all possible evidence. Information reported is typically based on abstracts and study authors' own conclusions, rather than detailed scrutiny of full texts.

What are the aims of a Topic Exploration Report?

Topic Exploration Reports offer an overview of the available evidence on a topic and aim to highlight any uncertainties or gaps in the evidence. These reports outline the quantity and type of evidence found, but no critical appraisal or formal evidence synthesis is conducted.

How should a Topic Exploration Report be used?

Topic Exploration Reports can be used to indicate what evidence may be available for a topic, and do not provide definitive guidance on how a technology should be used. The evidence presented within the reports should be interpreted with caution.

[1] Cyfieithu dogfennau HTW wedi'u cyhoeddi o'r Saesneg i'r Gymraeg
Translation of published technical HTW documents from English into Welsh

Topic exploration report number	TER627
Topic	Static progressive stretch orthoses for postoperative knee stiffness and arthrofibrosis
Summary of findings	Postoperative knee stiffness and arthrofibrosis are common complications following knee surgeries. Static progressive stretch (SPS) orthoses are devices worn around the knee that patients continually adjust to pain-free positions of end-range stretch over a 30-minute session. Each position is held for five minutes to allow for tissue relaxation to occur, and the device is then advanced to a new position of stretch. Three prospective cohort studies and a pre-post study were identified. All studies showed an improvement in range of motion measures with SPS orthoses; however, no studies included a comparator arm. No economic evidence was identified. There is currently a lack of evidence comparing SPS devices to standard of care methods of treating postoperative knee stiffness and arthrofibrosis. Therefore, it is not known whether the improvements in outcomes pre- and post-SPS treatment reflect better, worse, or similar performance to more commonly used methods.

Introduction and aims

Postoperative knee stiffness and arthrofibrosis are common complications following knee surgeries, including total knee arthroplasty (TKA) and anterior cruciate ligament reconstruction. There is currently a range of conservative and surgical options for this such as physiotherapy and manipulation under anaesthesia (MUA). Surgical options carry risks if they are performed too late after the initial surgery.

Static progressive stretch (SPS) orthoses are devices worn around the knee that patients continually adjust to pain-free positions of end-range stretch. Each position is held for five minutes to allow for tissue relaxation to occur, and the device is then advanced to a new position of stretch. Sessions typically last for 30 minutes. The Joint Active Systems (JAS) device (Medi) is an example of a CE-marked SPS orthosis. It is proposed that SPS orthoses could reduce the need for surgical interventions, lead to shorter rehabilitation times, reduce the number of outpatient sessions required, and are suitable for home-based rehabilitation.

Health Technology Wales researchers searched for evidence on the clinical and cost effectiveness of SPS orthoses for postoperative knee stiffness and arthrofibrosis.

Evidence overview

Guidance

NICE guideline 157 covers joint replacement for the knee, hip and shoulder (NICE 2020). Recommendations are made on postoperative care, however, SPS orthoses are not mentioned in the guidance.

Primary evidence

A systematic review of SPS was identified (Bhave et al. 2019); however, after reviewing the content, it included studies for knee and non-knee joints to reach its conclusion on SPS use for knee issues. Therefore, the review has been used to identify primary evidence only.

A cohort study included in the systematic review, reported the results of 29 patients (30 knees) who underwent SPS bracing with the JAS device for soft-tissue contracture after TKA or trauma (Seyler et al. 2007). The mean improvement in extension was 7.4° ± 8.1° and the mean improvement in flexion was 15.1° ± 12.3°. After a range of three to 33 weeks of treatment, the mean increase in total flexion-extension arc was 22.5° ± 16.3°. Authors report that all but two participants had a favourable outcome, with an increase in range of motion. An additional cohort study identified from the systematic review included 25 patients with knee stiffness after TKA who had no improvement with conventional physical therapy (Bonutti et al. 2010). Use of a SPS device led to a median increase in range of motion of 25° after a range of three to 16 weeks of treatment. The median increase in knee active flexion was 19°. The vast majority of patients (92%) were satisfied with the results. A third cohort study was identified from the systematic review (Bonutti et al. 2008). Forty-one patients with knee stiffness after TKA, who had no improvement with conventional physical therapy, were treated with SPS orthosis for a mean of nine weeks. The mean total arc of motion increased by 33° and 93% of patients were happy with results at final follow up of one year (range six months to two years). The authors concluded that SPS devices led to outcomes comparable to other nonoperative treatments but were achieved in a shorter treatment time; however, these nonoperative treatments were not delivered within this study and authors refer to comparisons with results from other published studies only.

One pre-post study published after the systematic review was identified. Pompe et al. (2022) evaluated the use of SPS for seven haemophilic patients with decreased range of motion after

Evidence overview

TKA, treated for a mean of 21.7 weeks. They state statistically significant increases in range of motion and Knee Society Score were found.

Areas of uncertainty

- There is a lack of comparative evidence available for SPS devices.
- It is unclear what the appropriate comparators would be for SPS, depending on when in the treatment pathway it is used.
- No economic evidence was identified for this technology.

Literature search results

Health technology assessments and guidance
NICE. (2020). Joint replacement (primary): hip, knee and shoulder. NICE guideline NG157. National Institute for Health and Care Excellence. Available at: https://www.nice.org.uk/guidance/ng157 [Accessed 07 October 2025].
Evidence reviews and economic evaluations
Bhave A, Sodhi N, Anis HK, et al. (2019). Static progressive stretch orthosis-consensus modality to treat knee stiffness-rationale and literature review. Ann Transl Med. 7(Suppl 7): S256. doi: https://doi.org/10.21037/atm.2019.06.55
Individual studies
Pompe B, Filipidis S, Dovč P. (2022). Impact of static progressive stretch on range of motion after total knee replacement in patients with haemophilia. J Rehabil Med Clin Commun. 5: 2285. doi: https://doi.org/10.2340/jrmcc.v5.2285
Included in systematic review by Bhave et al. (2019)
Bonutti PM, McGrath MS, Ulrich SD, et al. (2008). Static progressive stretch for the treatment of knee stiffness. The Knee. 15(4): 272-6. doi: https://doi.org/10.1016/j.knee.2008.04.002 Bonutti PM, Marulanda GA, McGrath MS, et al. (2010). Static progressive stretch improves range of motion in arthrofibrosis following total knee arthroplasty. Knee Surgery, Sports Traumatology, Arthroscopy. 18(2): 98. doi: https://doi.org/10.1007/s00167-009-0947-1 Seyler TM, Marker DR, Bhave A, et al. (2007). Functional problems and arthrofibrosis following total knee arthroplasty. JBJS. 89(suppl_3). doi: https://doi.org/10.2106/JBJS.G.00457

Date of search	07 October 2025
Concepts used	Static progressive stretch, SPS, brace, orthosis, knee stiffness, total knee arthroplasty, arthrofibrosis

Proposed research question and evidence selection criteria (if selected)

Proposed Research question	**What is the clinical and cost effectiveness of static progressive stretch orthoses for postoperative knee stiffness and arthrofibrosis?**

	Inclusion criteria	Exclusion criteria
Population	Patients with knee stiffness or arthrofibrosis after knee surgery	
Intervention	Static progressive stretch orthosis	
Comparison/ Comparators	• Physiotherapy- including manual therapy, therapeutic exercise, and range of motion protocols • Manipulation under anaesthesia	
Outcome measures	Range of motion Number of physiotherapy sessions required Requirement for surgical intervention Patient-reported pain Patient acceptability Patient adherence Safety and adverse events Health related QoL Resource use Economic outcomes	

Proposed speciality	**Musculoskeletal system**