USER EXPERIENCES AND BEHAVIOUR IN ORTHOTIC USE: FACTORS OF MOTIVATION AND SATISFACTION

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ABSTRACT

Orthoses are externally applied devices intended to modify or support neuromuscular and skeletal function and are widely used to reduce pain, improve stability, and maintain participation in daily activities. Despite advances in materials, design, and service delivery, real-world adherence to prescribed orthosis wearing regimens often remains suboptimal, limiting therapeutic effectiveness. This narrative review synthesises evidence on user behaviour, motivation, and satisfaction in orthosis use, integrating clinical and consumer-behaviour perspectives. A targeted search of major biomedical databases and key standards documents was conducted, prioritising studies that report adherence, reasons for discontinuation, and validated satisfaction outcomes (e.g., QUEST 2.0; OPUS). The synthesis indicates that adherence is shaped by a dynamic balance between perceived benefits (pain relief, functional gains, avoidance of surgery, prevention of deterioration) and perceived burdens (discomfort, skin irritation, restricted movement, heat, aesthetic concerns, stigma, and disruption to routines). Service quality—especially accurate fitting, education, and follow-up emerges as a modulator of satisfaction and continued use. Evidence also suggests self-reported wearing time may overestimate actual wear, supporting selective use of objective monitoring in high-stakes indications. The review concludes that maximising orthosis effectiveness requires an integrated, user-centred approach that combines biomechanical optimisation with psychosocial support, clear communication, and iterative service delivery.

Keywords: *orthoses; orthopedic braces; adherence; patient satisfaction; motivation; user experience; service quality*

1. INTRODUCTION

Orthoses (often referred to as orthopaedic braces or supports) are a major class of assistive medical devices designed to protect, stabilise, correct, or otherwise influence the structural and functional characteristics of the neuromuscular and skeletal systems [1]. Their clinical purpose commonly includes pain reduction, improved joint stability, prevention of secondary injury, post-operative or post-trauma support, deformity correction, and functional assistance in chronic conditions [2,3]. Orthoses are therefore positioned at the intersection of engineering design, clinical decision-making, behavioural adherence, and real-world daily living.

Demand for orthopaedic braces and supports has increased in the mid-2020s, amid population ageing, a higher prevalence of musculoskeletal disorders, expanding rehabilitation needs, and sustained participation in sports and leisure activities [4,5]. Market estimates differ by methodology, but multiple analyses place the global orthopaedic braces/supports market at mid–single-digit billions (USD) in the mid-2020s, with projected growth through 2030 [4,5]. From a health services and outcomes perspective, increasing access and technological sophistication do not guarantee that prescribed orthoses deliver the intended benefits if users do not wear them as recommended.

A persistent and clinically consequential gap exists between prescribed orthosis wear and actual orthosis use. This gap is often described as “compliance” in older clinical language; however, contemporary frameworks emphasise “adherence” as a multidimensional behaviour influenced by patient, therapy, condition, healthcare system, and socioeconomic factors [6]. Orthosis adherence is particularly relevant when therapeutic benefit is dose-dependent, as in adolescent idiopathic scoliosis (AIS) bracing, where hours of wear are associated with the probability of treatment success [7]. Similarly, in knee osteoarthritis, a substantial proportion of users discontinue unloader braces within a year, commonly due to discomfort, inadequate symptomatic relief, poor fit, and skin irritation [8]. In such contexts, adherence becomes not merely a behavioural afterthought but a mechanism through which orthotic efficacy is realised or undermined.

Orthosis use also has a psychosocial dimension. Especially among adolescents, brace visibility, perceived stigma, and body image concerns can negatively influence satisfaction and willingness to wear the device in public or for the prescribed duration [9–11]. These factors can create a paradox: the individuals who may benefit substantially from consistent brace wear (e.g., AIS patients at risk of progression) may also experience heightened emotional and social burdens that reduce adherence.

From a measurement standpoint, understanding orthosis-related satisfaction and service experience is strengthened by the use of validated instruments. The Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0) evaluates satisfaction across device and service dimensions, including comfort, effectiveness, usability, and professional services [12,13]. The Orthotics and Prosthetics Users’ Survey (OPUS) similarly provides structured modules to assess outcomes and satisfaction with devices and services [14]. These tools enable a patient-centred, quality-improvement orientation consistent with global guidance that assistive products require appropriate services (assessment, fitting, follow-up) to be effective in practice [3,15].

Aim and contribution. This manuscript aims to synthesise and conceptually integrate evidence on the determinants of user behaviour, motivation, and satisfaction in orthosis use, emphasising how these determinants shape adherence and, consequently, treatment effectiveness. The manuscript also translates these determinants into practical recommendations for orthosis design, clinical service delivery, and future research.

2. MATERIALS AND METHODS

This manuscript is a targeted narrative review and secondary synthesis of published evidence addressing orthosis user behaviour, motivation, satisfaction, and adherence. The approach is appropriate given the heterogeneity of orthosis types, indications, and outcome measures, as well as the need to integrate clinical evidence with behavioural and service-quality constructs [6,12,14].

Included sources met one or more of the following conditions: 1) reported adherence/wearing time or continuation/discontinuation rates for orthoses; 2) examined determinants of adherence (e.g., comfort, aesthetics, psychosocial factors, health belief constructs); 3) reported patient satisfaction using validated tools (e.g., QUEST 2.0, OPUS, D-QUEST); 4) addressed orthosis service delivery standards (assessment, fitting, follow-up); or 5) investigated objective adherence monitoring (e.g., sensor-based wear tracking). Excluded sources were purely technical engineering papers without user outcomes and opinion pieces lacking empirical or standards grounding.

A targeted search was conceptually structured around biomedical databases (e.g., PubMed/MEDLINE) and standards repositories. Search terms combined orthosis/brace terminology with constructs of adherence and satisfaction (e.g., "orthosis and adherence," "brace compliance and scoliosis," "knee unloader brace use," "QUEST 2.0 orthotics," "OPUS orthotics satisfaction"). Additional "citation chaining" was applied from key papers and standards documents to identify foundational and recent evidence on adherence measurement and psychosocial determinants [6–8,12,14].

For each included source, the following data were extracted qualitatively: population/indication, orthosis type, adherence definition/measurement method (self-report vs objective), satisfaction domains, reported barriers/facilitators, and service-related factors (fitting, education, follow-up). Findings were synthesised into a conceptual model linking determinants to satisfaction and adherence, and adherence to treatment effectiveness.

No human subjects were recruited, and no identifiable patient data were used in this review; therefore, ethics committee approval was not required.

Generative AI was used in a supportive capacity to support structural organisation. All academic content, interpretation of sources, and scholarly conclusions remain the independent work of the authors.

3. RESULTS AND DISCUSSION

3.1. Overview of the evidence synthesis

Across orthosis contexts, adherence emerges as a behavioural outcome shaped by a trade-off between perceived benefits and perceived burdens, moderated by service quality and psychosocial context [6,8,9]. This pattern is consistent with a multidimensional adherence model and supports treating orthosis use as a user-centred health behaviour rather than a purely mechanical intervention [6,15].

3.2. Context of orthosis use: types, functions, and service dependency

Orthoses are used across multiple anatomical regions (e.g., foot orthoses, knee braces, spinal orthoses, wrist-hand splints) and indications (acute injury stabilisation, chronic degenerative disease management, rehabilitation, deformity correction) [1–3]. While device design determines the mechanical action (support, unloading, immobilisation, alignment), real-world effectiveness depends on fitting accuracy, user training, maintenance/adjustments, and follow-up services [3,12,15]. The WHO standards for prosthetics and orthotics emphasise that assistive products require accompanying services and user-centred decision-making to achieve functional and participation benefits [3,15]. This standards perspective reinforces a service-dominant view: the orthosis is not only a product but also a clinical service pathway.

3.3. Adherence patterns and the importance of measuring actual wear

Dose dependence and scoliosis bracing. In AIS, high-quality evidence shows that bracing can reduce progression to surgical thresholds, and greater daily wear time is associated with a higher likelihood of success [7]. This establishes adherence (hours worn) as a mechanism of action rather than merely a behavioural correlate.

3.4. Attrition in osteoarthritis knee bracing

In knee osteoarthritis, a commonly prescribed intervention is an unloader brace, intended to reduce pain and improve function by mechanically unloading the joint.

However, longitudinal data show that only a minority of patients continue regular use for 1 year or more, with discontinuation attributed to insufficient symptom relief, discomfort, poor fit, and skin irritation [8]. This pattern highlights a key behavioural reality: even clinically rational prescriptions can fail if the lived experience of use is negative.

3.5. Self-report bias and objective monitoring

Evidence indicates that self-reported wearing time can overestimate objectively measured wear. Sensor-based monitoring and other objective approaches have been adopted in AIS research and clinical practice to improve measurement fidelity and support counselling [16,17]. Systematic reviews suggest sensors provide continuous monitoring and can be integrated with education/counselling interventions to improve adherence, though study quality and generalizability remain variable [16].

3.6. Determinants of motivation and continued use

Motivation to wear an orthosis is strongly supported when users perceive meaningful benefit- pain reduction, improved stability, functional independence, prevention of deterioration, or avoidance of surgery [7,8,18]. In AIS, avoiding progression and surgery is a salient motivator, and the effectiveness of bracing reinforces adherence when communicated clearly and experienced as valuable [7,10]. In chronic neuromuscular conditions, motivation may also centre on preserving function and delaying contractures, even if comfort challenges persist [18].

3.7. Psychosocial and cognitive drivers

Beliefs, intentions, social norms, and perceived behavioural control influence orthosis adherence. For example, adherence to ankle-foot orthoses (AFOs) in stroke populations has been modelled using the Theory of Planned Behaviour, in which intention predicts adherence and is shaped by attitudes and perceived control [19]. This supports a pragmatic implication: interventions that improve perceptions of benefit, reduce perceived barriers, and strengthen user self-efficacy may increase orthosis use.

3.8. Common barriers to adherence and satisfaction

Comfort and physical burden. Discomfort is repeatedly identified as a dominant barrier, including pressure points, skin irritation, heat, bulk, and restricted movement [8,13,18]. In practical terms, discomfort can negate perceived benefits, particularly when symptom relief is not immediate or when the orthosis interferes with valued daily activities.

3.9. Aesthetics, stigma, and body image

For adolescents wearing spinal braces, body image concerns and fear of negative social attention are central burdens [9–11]. Quantitative and qualitative findings show brace treatment can affect perceived happiness, satisfaction, and self-image relative to peers, underscoring that psychosocial costs can be clinically significant even when physical outcomes improve [9,11]. These burdens justify design and service innovations that reduce visibility, improve aesthetics, and normalise brace use through supportive counselling and peer-informed strategies.

3.10. Service and system barriers

Even a well-designed orthosis can fail when service delivery is inadequate- poor fitting, insufficient education, delayed adjustments/repairs, or weak follow-up [3,12,15]. Standards emphasise the necessity of user-centred decision-making and regular follow-up to ensure fit, acceptability, and documentation of outcomes [15]. At a behavioural level, insufficient service can reduce trust and perceived value, thereby reducing intention to continue use [19].

3.11. Determinants of satisfaction and how satisfaction relates to adherence

Validated satisfaction frameworks. QUEST 2.0 conceptualises satisfaction across device attributes (e.g., comfort, effectiveness, ease of use) and service dimensions (professional services, repair/follow-up), positioning satisfaction as a multidimensional construct relevant to continued use [12,13]. OPUS provides modules for assessing device and service satisfaction and functional outcomes, supporting quality assessment in orthotic programs [14].

3.12. Satisfaction as a predictor of continued use

The behavioural pathway implied by the literature is: device/service experience, satisfaction, intention/continued use, adherence, clinical outcome. This is consistent with evidence that discomfort and poor fit contribute to discontinuation in knee bracing and hand orthoses [8,18]. It is also consistent with assistive-technology service frameworks that treat satisfaction and user participation as key outcomes of effective provision [3,12,15].

3.13. Limitations

This review is limited by heterogeneity across orthosis types, indications, and adherence measurement methods. In particular, adherence estimates depend on whether studies use self-report, clinician estimates, or objective sensors; self-report may overestimate true wear [16,17]. Evidence is also uneven across populations: AIS and knee osteoarthritis have relatively visible adherence and outcomes research, while many everyday orthosis uses (e.g., low back supports) may be underrepresented in high-quality adherence studies. Furthermore, although behavioural frameworks (e.g., Theory of Planned Behaviour) have been applied to orthosis adherence, broader theory-informed intervention trials remain limited, and causal inference is often constrained by observational designs [19].

3.14. Recommendations

Design recommendations. Comfort optimisation should be treated as a primary therapeutic objective rather than a secondary feature, given its centrality to continued use [8,13]. Aesthetic acceptability should be incorporated as a design requirement in populations sensitive to visibility and stigma, particularly adolescents [9–11]. Iterative personalisation- adjustments after initial fitting based on user feedback- should be built into routine care pathways [12,15].

3.15. Service recommendations

Orthosis provision should follow a user-centred service model, emphasising shared decision-making, education, and regular follow-up to safeguard the acceptability of fit and function and to document outcomes [15]. Practical adherence support should include clear explanations of expected benefit timelines, management of discomfort/skin issues, and contingency plans for adjustments and repairs [3,12].

3.16. Behavioural and monitoring recommendations

Where outcomes are strongly dose-dependent (e.g., AIS bracing), selective objective monitoring with feedback-informed counselling may improve adherence and support accurate clinical decision-making [7,16]. Behavioural strategies should target intention, perceived behavioural control, and attitudes about orthosis value, consistent with evidence that these constructs can predict AFO adherence [19]. For adolescents, interventions should explicitly address body image, social participation, and school-context constraints, with mechanisms for family and peer support [9–11].

4. CONCLUSIONS

Orthosis effectiveness in real-world care is mediated by user behaviour- specifically, whether and how consistently users wear devices as prescribed. Evidence indicates that adherence can be low in practice and that the therapeutic effect depends on the "dose"; reduced adherence can substantially reduce outcomes. Adherence is determined by a balance between perceived benefits (symptom relief, function, prevention of deterioration, avoidance of surgery) and perceived burdens (discomfort, restricted mobility, heat, aesthetics, stigma), with service quality acting as a critical moderator. Validated satisfaction tools (e.g., QUEST 2.0, OPUS) reinforce the idea that both device and service domains shape the user experience and continued use. Optimising orthosis care, therefore, requires an integrated, user-centred approach that combines biomechanical design excellence with high-quality service delivery, psychosocial support, and, where appropriate, objective monitoring and feedback. Future research should prioritise theory-informed interventions and standardised adherence measurement to strengthen causal understanding and improve orthosis outcomes at scale.

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