

Preferred exercise modalities in patients with intermittent claudication

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1 **Title:** PREFERred Exercise Modalities in Patients with Intermittent Claudication.

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Abstract

7 Objectives

8 Conventional supervised exercise programmes (SEP) for claudicants are traditionally based
9 on time-constrained, group-based structured programmes usually at a hospital site. Uptake of
10 SEP is poor, despite the high level evidence demonstrating its clinical effectiveness, therefore
11 alternative forms of exercise programmes are needed which are more acceptable to patients.
12 This study aimed to explore a range of exercise modalities to determine patient preferences
13 for exercise delivery on a national level.

14 Methods

15 This was a questionnaire survey to identify and incorporate patient preferences when
16 designing a multi-centre nationwide health-service evaluation of patient preference to
17 exercise in the UK NHS (the PREFER study). Patients with documented stable intermittent
18 claudication (IC) who were suitable for an SEP were given a questionnaire to fill out at their
19 clinic visit. Data was recorded using the Bristol Online Survey tool
20 (<http://www.survey.bris.ac.uk/>) and analysed descriptively.

21 Results

22 Thirty complete questionnaires were analysed. Participants were generally unilateral
23 claudicants (80 %) with symptoms for over 1 year (64 %). Only 6 of the 30 patients had
24 engaged in a lifelong routine of exercise. 87% patients indicated that they had not taken part
25 in an exercise programme but 73% of those indicated that they would be willing to participate
26 to improve their walking. Most patients expressed a preference for a home exercise
27 programme (50%) followed by a hospital SEP. The majority of patients (43%) were happy to

28 exercise three days per week using a walking based programme (53%). There was however
29 no consensus on the duration or intensity of the exercise programme.

30 **Conclusions**

31 SEP is the recommended first line treatment for IC patients, however the vast majority of
32 patients fail to engage with or complete an exercise programme. This study demonstrates that
33 exercise therapy should be individualised and take a patient-centred approach.
34 Commissioning groups should incentivise hospitals and clinicians to engage with their patient
35 populations to understand their needs and deliver an appropriate service.

36 **Keywords:** intermittent claudication (IC), structured exercise programme (SEP),
37 questionnaire survey

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48 **Introduction**

49 It is estimated that 5% of the population over the age of 50 will suffer with ischaemic muscle
50 pain during exercise due to intermittent claudication (IC), a symptom of peripheral arterial
51 disease (PAD) (1). IC has a significant effect on physical activity levels, walking ability and
52 ultimately quality of life (2). In 2012 the National Institute of Clinical Excellence (NICE)
53 published guidance that every patient with IC should be treated initially with best medical
54 therapy and a supervised exercise programme (SEP) (3). However a systematic review and
55 survey demonstrated that service provision, patient uptake and patient adherence within the
56 United Kingdom's National Health Service (UK NHS) is still relatively poor (4, 5).

57 In the UK the NHS provides free and accessible healthcare to all. The UK NHS offers SEP as
58 a group-based structured exercise programme 2 – 3 times per week for a minimum of 12
59 weeks (4, 5). However there is wide variation across the UK in the duration and frequency of
60 SEPs (5). Commonly cited reasons for non-attendance include time constraints, travel and
61 transport difficulties and family commitments(6). Dropout rates are variable but can be as
62 high as 50%, which is similar to other rehabilitation programmes (7). Alternative exercise
63 provisions are needed which are more acceptable and appealing to patients. However, patient
64 exercise preference has not been investigated in this specific patient population (8). Data
65 from other populations have suggested that online and home interventions are both popular
66 and successful (7, 9).

67 The aim of this study was to assess the gap between patient preference and modes of current
68 exercise prescription in the UK NHS for patients with intermittent claudication.

69 **Methods**

70 *Design*

71 This was a questionnaire survey to identify and incorporate patient preferences in designing
72 and implementing a multi-centre nationwide health-service evaluation in the UK NHS (the
73 PREFER study). A questionnaire was developed to assess key points regarding exercise
74 programmes for IC patients. To ensure clarity and content validity the questionnaire it was
75 reviewed by a group of vascular specialists (8 vascular consultants, 3 research nurses and 7
76 vascular fellows) and tested on 5 IC patients in a SEP at a tertiary vascular unit in the UK
77 NHS. Questions focused on the likelihood of participation, previous experience and
78 preference of service delivery format.

79 *Patients*

80 Patients with stable IC on best medical therapy were identified and selected at their clinic
81 visit. The responsible clinician (vascular surgeon/registrar or vascular nurse specialist)
82 completed the demographic and medical questions in section one. Patients were then
83 requested to complete section two which contained an initial explanatory section followed by
84 questions assessing patients exercise history, perceptions and preferences. Patients were
85 excluded if they could not understand written English or did not have capacity to understand
86 the health-service evaluation. All questionnaires were given a unique and confidential
87 participant identifier.

88 *Data Extraction*

89 Data was recorded using the Bristol Online Survey (BOS) tool
90 (<http://www.survey.bris.ac.uk/>) and analysed descriptively. The BOS tool is a web-based
91 programme that allows users to create surveys, record data and analyse results.

92 **Results**

93 A total of 30 completed questionnaires were collected and included in the analysis. Sixteen
94 patients were male and 14 patients were female. The mean age of patients was 69.5 ± 7 years.

95 Patients mainly reported unilateral symptoms (80 %) and had symptoms for over 1 year (64
96 %). All patients reported symptom duration > 3 months. Ten patients were active smokers, 15
97 had recently quit smoking, while 5 had never smoked. Common co-morbidities included
98 hypertension (19 patients) and diabetes (7 patients). Less common co-morbidities included
99 chronic obstructive pulmonary disease, asthma, chronic kidney disease, atrial fibrillation,
100 ischemic heart disease and dyslipidaemia.

101 *Previous Physical Activity*

102 Only 6 patients had engaged in a lifelong routine of exercise. 14 patients stated that they had
103 participated in some form of exercise during adulthood but this was not maintained. The
104 remainder of patients had done no formal physical activity since leaving secondary school.

105 *Barriers to Participation*

106 Time was the most commonly reported barrier to SEP attendance (28%) followed by travel
107 (23%). Patients reported musculoskeletal issues e.g. back or joint pain (25%) or cardio-
108 respiratory complaints (13%) e.g. asthma or breathlessness which precluded exercise. The
109 expense associated with exercise class attendance was reported by 2 patients as a barrier to
110 SEP. One patient stated that they would be embarrassed to attend the SEP but did not give a
111 reason why and another patient highlighted work as a barrier. The remaining two patients
112 indicated that they had no restrictions to attending an SEP.

113 *Perception to Exercise*

114 Twenty-six (86.7%) patients had never previously participated in a SEP. Only four patients
115 had taken part in some form of an exercise programme, which included cardiac rehabilitation
116 and “physical therapy”. Twenty-two (73%) patients stated that they would like to take part in
117 an exercise programme to improve their walking. Comments from patients who preferred not
118 to participate in a SEP included: full time working, no spare time and legs too painful to
119 walk.

120 *Preference to Exercise (Table 1)*

121 33% of patients preferred group exercise, 36.7% preferred to exercise alone while the
122 remainder were happy to consider either option. 50% of patients preferred home exercise,
123 36.6% preferred a hospital-based programme, 10% preferred a community (gym) based
124 programme and 3.3% indicated they would like an online web based system. Of the 63.3%
125 preferring a non-hospital based programme, only 26.3% indicated no support was required.
126 The remainder expressed a preference for ongoing support in the form of a monthly face-to-
127 face meeting (26.3%), email (10.5%) or phone call (21%), or weekly emails (10.5%) or
128 phone calls (5.3%).

129 When asked how many days per week they would prefer to exercise 43.3% of patients were
130 happy to exercise 3 days per week, 36.6% patients preferred 2 days per week, 10% patients
131 preferred once per week and 10% patients indicated they were happy to exercise more often.
132 With regard to preferred exercise duration the most popular option was 30 minutes (26.7%)
133 followed by 60 minutes (23.3%), 20 minutes (16.7%), 40 minutes (16.7%) and the remaining
134 selected another option. In response to preferred exercise modality 53.3% of patients were
135 happy with a walking based exercise programme, 36.7% preferred swimming and the rest
136 selected dancing, strength sessions, circuit training and cycling. Finally, preference for

137 exercise intensity was equally divided between short duration/high intensity and long
138 duration/moderate intensity.

139 **Discussion**

140 Within the UK NHS the guidelines for exercise in patients with IC indicate that they should
141 take part in a SEP at least twice per week for a period of 12 weeks, however the provision of
142 SEP is widely variable across the country (5). In addition not all patients are able to attend the
143 exercise programmes on offer. Clearly this suggests that alternative forms of exercise
144 provisions are needed and this has been investigated in other clinical populations (8).

145 It is not surprising that the majority of patients with IC in this study had not engaged or were
146 not engaging in regular physical activity. It is acknowledged that PAD is frequently
147 associated with unhealthy lifestyle choices (e.g. high prevalence of smokers) and these
148 patients are perhaps the least likely to engage or commit to improved lifestyle behaviours
149 (10). Indeed only 6 patients (20%) were engaged in a lifelong routine of exercise. A previous
150 study has demonstrated that patients with claudication report that leg symptoms significantly
151 impair their day to day ability to function which may lead to a negative cycle of disability
152 with reduced activity leading to symptom deterioration (6). This could perhaps explain why
153 PAD patients are less committed to engage with exercise compared to their age matched
154 healthy peers. An overwhelming 87% of patients had never taken part in an exercise
155 programme (gym/rehabilitation etc.), but 73% said that they would take part in exercise if
156 offered to improve their walking. This is substantially different to findings reported in clinical
157 practice where only 1 in 3 patients with IC actually attend and complete an exercise
158 programme (5). At initial review with a vascular consultant, patients often agree to participate
159 in an SEP but then decline or do not commit to a programme when given a firm offer. This

160 may reflect the fact that current SEPs do not match patient's specific expectations,
161 requirements or preferences.

162 As we have previously documented, time (both inconvenient time of SEP and time to travel)
163 is one of the biggest barriers to physical exercise (6) and was the most commonly cited
164 reason for non SEP attendance by patients in this study. Additionally, leg pain was also
165 mentioned as one of the biggest reasons or possibly "fears" for attending an exercise
166 programme. Previous evidence supports our findings that pain or fear of pain may discourage
167 patients from exercising (11). However, systematic reviews suggest that clinically relevant
168 improvements in walking distance can be attained at a lower threshold, without inducing
169 pain, which may increase participation rates (8, 12). A meta-analysis demonstrated that an
170 adjunctive exercise, such as arm ergometer, produced superior results for cardio-respiratory
171 fitness (13). A pilot randomised control trial demonstrated arm ergometer could also improve
172 pain free walking distance and maximal walking distance, offering an alternative to treadmill
173 based exercise (14). Despite this high level of evidence, walking up to and past the point of
174 pain is encouraged in SEPs. Perhaps if this advice were revised it may improve uptake and
175 adherence to exercise programmes (8).

176 A systematic review demonstrated that SEPs are superior in terms of outcome compared to
177 home exercise (15, 16). However home exercise programmes which come with patient
178 support may be as beneficial as a SEP and could facilitate greater uptake and adherence to
179 programmes (17). In this study almost half the patients indicated that they would prefer to
180 exercise at home, with only 37% preferring exercise in the hospital setting. Perhaps hospital
181 trusts and commissioning groups (who strategise, plan and buy healthcare services for local
182 NHS providers) should consider providing alternative exercise options for patients. Patients
183 who preferred a home based programme generally expressed a preference for regular support

184 but the frequency and method of support varied considerably. This validates individual
185 patient specific management based on patient preferences, however this may be difficult for
186 the service providers to deliver.

187 Most UK vascular centres with SEPs aim to deliver 2-3 supervised sessions per week. NICE
188 and TASC-II guidelines recommend patients should commit to two hours exercise per week
189 (1, 3, 5). World Health Organisation and the American College of Sports Medicine guidelines
190 recommend patients participate in moderate to vigorous exercise three days per week (18).
191 The majority of patients in this study were happy to exercise between 2 and 3 days per week.
192 However many vascular centres are limited to providing exercise programmes on only 1 or 2
193 days a week frequently restricted by funding, staffing and resource issues (4, 5, 19). Home-
194 based programmes may help alleviate some of these restrictions as observed with cardiac
195 rehabilitation programmes (20).

196 SEPs are commonly walking based often on a treadmill to maintain walking speeds and
197 distances (12). This was the preferred mode of exercise for over 50% of patients in this study.
198 Swimming was the next most popular exercise modality but this mode of exercise in this
199 specific group of patients has not been investigated and perhaps merits further research.
200 Perhaps alternative exercise programmes (e.g. including swimming, arm ergometer etc.) may
201 be more appealing and suitable for claudicants who fear or struggle with walking based
202 programmes.

203 **Conclusions**

204 SEP is the recommended first line treatment for all patients with IC, however the majority of
205 patients with IC fail to engage with or complete an exercise programme. Evidence from this
206 study supports the provision of exercise therapy which is individualised and patient-centred.

207 Commissioning groups should incentivise hospitals and clinicians to engage with their patient
208 populations to understand their needs and deliver an appropriate service.

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