Physiotherapy management of greater trochanteric pain syndrome (GTPS): an international survey of current physiotherapy practice.

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Citation

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ABSTRACT

Objectives: This study aimed to establish and compare current physiotherapy management of GTPS in Australia, New Zealand (NZ) and Ireland.

Design: Cross-sectional observational survey of physiotherapists.

Methods: An online survey was distributed to registered Musculoskeletal physiotherapists in Australia, NZ and Ireland. Ordinal and nominal data were analysed using frequency counts or mean ranks; median and interquartile ranges were calculated for numerical data. Inter-country comparisons were made using Chi-squared analyses for nominal/ordinal data and Kruskal-Wallis tests for numerical data. Statistical significance was set at p<0.05.

Results/findings: Valid responses were received from 361 physiotherapists, 62% were female and 80% worked in private practice. Overall, consistency in treatment of GTPS was observed across the three countries. All physiotherapists used education and exercise (most commonly strengthening and neuromuscular control) primarily targeting the gluteal muscles. Other interventions included massage (90%), stretching (53%), range of motion (40%), thermal modalities (50%), taping (38%) and electrotherapy (25%), whilst 40%
commonly recommended up to 2-3 corticosteroid injections per patient/per annum. Physiotherapists used pain severity scales as their primary outcome measure (79%). Single leg stance was the most common physical measure used (68%), and global rating scores or standardised physical measures were less commonly used.

**Conclusion:** This international survey established the physiotherapy management of GTPS. Education used in conjunction with exercise is in line with current evidence, but a proportion of clinicians use adjunct treatments without clear rationale or supporting evidence. Results indicate the need to further define optimal management of GTPS using robust methodologies such as randomised controlled trials.

**Keywords:** greater trochanteric pain syndrome; gluteal tendinopathy; physiotherapy; exercise; load management; evidence-based practice

**Introduction**
Greater trochanteric pain syndrome (GTPS), characterised by pain over and around the greater trochanter, is associated with local soft tissue pathologies such as gluteal tendinopathy and trochanteric bursitis [1, 2]. It is particularly prevalent in post-menopausal women [3-5] with substantial negative impacts on function, sleep and quality of life [6, 7].

Several papers have described the management of GTPS and its associated pathologies [8-10]. A 2012 systematic review [11] evaluated surgical and conservative management such as corticosteroid injection (CSI), short-wave therapy and exercise for GTPS. Low to moderate study quality prevented the authors from providing definitive recommendations for GTPS management. A 2017 systematic review on conservative treatments for GTPS reported persistent paucity of high quality research, concluding that convincing evidence exists only for CSI, with short to medium term benefit; limited evidence exists for shock-wave therapy and home exercise [12].
In recent years, evidence regarding impairments in this population has substantially expanded with deficits in hip abductor strength [13, 14] and motor control disturbances during single leg stance [15] and gait [16, 17] reported, providing a framework for evidence-informed physiotherapy intervention. High-quality evidence has recently become available, since the completion of this survey, from two randomised clinical trials (RCTs) [18, 19]. These demonstrated that education, including load management and exercise interventions, are important components of primary care of GTPS [18, 19]. Dry needling provided similar levels of pain relief to CSI in a non-inferiority RCT, however inclusion criteria were limited only to presence of lateral hip pain [20]. We found no published evidence for the use of manual therapy, taping, electrotherapies, thermal agents or acupuncture, although anecdotally these are commonly employed in clinical practice. Current practices in the physiotherapy management of GTPS are unknown and consequently, this study aimed to identify and compare current physiotherapy interventions for GTPS reported by physiotherapists in Australia, New Zealand (NZ) and Ireland. Details of diagnostic methods and knowledge development used by physiotherapists have been published elsewhere [21].

Methods

Study Design and Sample

We used a cross-sectional observational design using an originally designed anonymous online survey.

Registered physiotherapists in Australia, NZ or Ireland who were members of their respective national professional bodies and working primarily in musculoskeletal or sports settings were included. Potential participants were invited to take part in the survey via invitations from, or advertising through appropriate clinical interest groups of the respective professional organisations (Australian Physiotherapy Association, Physiotherapy New Zealand and Irish Society of Chartered Physiotherapists). Based on membership numbers the target population was estimated at 4200
physiotherapists (Australia, 2750; NZ, 750; Ireland, 700). The required sample size, based on a 5% margin of error, was estimated as 352 (https://www.surveysystem.com/sscalc.htm). Members were sampled allowing for non-response, including therapists who do not manage people with GTPS.

**Ethics**

Ethics approval was provided by the research ethics committees at the University of Canberra, Australia (REC1346b); University of Otago, NZ (D17/062) and Royal College of Surgeons in Ireland (REC1346). Participant information was provided at the beginning of the survey and informed consent assumed if participants continued past the first question.

**Survey Development and Pilot**

The survey was designed by an international collaboration of five physiotherapists with research and clinical expertise in GTPS. It contained 51 questions on physiotherapists' management of GTPS and how they update their knowledge, diagnostic criteria used, treatments implemented and demographic details (Appendix 1). Following pilot testing of the survey on 16 physiotherapists, minor amendments were made to improve survey flow.

**Data Collection and Statistical Analyses**

Data were collected via SurveyMonkey and data analysis performed with SPSSv24 statistical software (IBM Corp, Chicago, Illinois, USA). Only responses where ≥ 80% of data was complete was included. Respondents who provided no professional or demographic details were excluded. Data were analysed descriptively, using means and standard deviations for numerical data and frequency counts for nominal and ordinal data. For frequency responses which used a Likert scale (never, rarely, sometimes, often, always) mean ranks were calculated (1 being most important and lower ranks indicating greater importance). Treatments between the countries were compared using Chi-
squared analyses for nominal/ordinal data and Kruskal-Wallis tests for numerical data due to non-normality of the data. Statistical significance was set at p<0.05.

Results

Survey response

A total of 441 respondents completed the survey. Responses from a valid sample of 361 respondents were analysed. Australians represented 58% of the sample (211/361) with 20% (72/361) from NZ and 22% (78/361) from Ireland. As not all questions required an answer, answers may not always total 100%. In other cases, more than one answer to a question was allowed, returning totals greater than 100%.

Professional/Demographic Details and Practice Characteristics

Most respondents were female (Table 1) and worked in private practice, with a higher proportion of NZ (61/72, 85%) and Australian (177/211, 84%) respondents in private practice than Irish (50/78, 64%) (p<0.001). Australians were more experienced (p=0.03) than Irish or NZ respondents. Most respondents had a Bachelor of Physiotherapy degree and formal postgraduate education, with postgraduate qualifications proportionally lowest amongst Australian respondents (p=0.014) (Table 1).

INSERT TABLE 1 HERE

Treatment of GTPS

Treatment goals, presented as mean ranks, show that across all countries patient education (2.6), improvement of sleep (2.96) and pain relief (3.17) during the day were the top three priorities (Appendix 2).
Interventions used by surveyed physiotherapists are shown in Table 2. Education and exercise were used by 100% of respondents. Manual therapy/massage was next most common, followed by thermal agents; commonly advised for home use. Electrophysical agents were provided by 25% (91/365) of respondents, with variation in use between countries (Australia 54/211, 26%; NZ 12/72, 17%; Ireland 25/78, 32%). Application of heat and cold therapies was broadly similar between clinic and home settings: cryotherapy in the clinic (150/361, 42%) and at home (169/361, 47%); heat therapy in the clinic (157/361, 43%) and at home (168/361, 47%). Electrotherapy was overall less commonly employed with ultrasound used most commonly (74/361, 20%), followed by TENS (35/361, 10%) (Appendix 3). Taping was used by 38% (137/361), most commonly for symptom relief and to unload the tendon (Appendix 4).

Other exercise interventions (not shown in Table 2) which were either ‘always’ or ‘often’ selected included Pilates (124/361, 34%), yoga (26/361, 7%) and Tai-Chi (9/361, 3%), with no significant inter-country difference in use of Pilates or, Tai-Chi. Yoga was more often prescribed, ‘always’ or ‘often’ by Irish respondents (11/78, 14%), compared with Australia (11/211, 5%) and NZ (4/72, 6%). Overall use of dry needling was 24% (85/361) and 9% for acupuncture (31/361). There was a significant difference in use of acupuncture (p<0.001), with more NZ respondents using it either ‘always’ or ‘often’ (14/72, 19%), compared to Ireland (7/78, 9%) or Australia (14/211, 7%), but no significant intercountry difference in use of dry needling.

**INSERT TABLE 2 HERE**

**Education**

Education on various topics was provided by physiotherapists, most frequently on pathology of GTPS, self-management, load management and physiotherapy treatment (Figure 1).

**INSERT FIGURE 1 HERE**
**Exercise Type**

Various exercise formats were used, strengthening most regularly (352/361, 98%), followed by neuromuscular control exercise (310/361, 86%). Stretching was prescribed more (191/361, 53%) than range-of-motion (ROM) exercise (145/361, 40%), whilst cardiovascular exercise (87/361, 24%) and hydrotherapy (92/361, 25%) were less commonly implemented (Figure 2). There was inter-country variation, with Australian physiotherapists using more hydrotherapy, but less cardiovascular exercise than their NZ and Irish colleagues.

**INSERT FIGURE 2 HERE**

A combination of eccentric and concentric exercise was most common, followed by isometric exercise; weightbearing exercise was selected over non-weightbearing exercise in all countries (Table 3).

**INSERT TABLE 3 HERE**

**Strengthening and Neuromuscular Control**

The gluteal muscles were most commonly targeted for strengthening, followed by the deep hip lateral rotators (Figure 3). Figure 4 shows frequency of use of neuromuscular control exercise.

Function and gait were most commonly targeted, with retraining of sport-related activities such as landing control and plyometrics employed less often.

**INSERT FIGURE 3 HERE**

**INSERT FIGURE 4 HERE**
**Stretching and ROM**

Stretching was a treatment choice of 53% (191/361) of respondents, with the iliotibial band (ITB) (114/361, 32%), iliopsoas (107/361, 30%) and quadriceps (96/361, 27%) most commonly targeted (based on ‘always’ and ‘often’ responses). There was a difference in the use of stretching for gluteus maximus (GMax) (p=0.003), prescribed ‘always’ or ‘often’ by Irish (35/78, 45%) and NZ (29/72, 40%) respondents, compared to Australians (51/211, 24%). Quadriceps stretching was also selected more often in Ireland (30/78, 38%), compared to NZ (18/72, 25%) and Australia (48/211, 23%). Whilst intercountry differences were evident for gluteus medius/gluteus minimus (GMed/GMin) (p=0.001), there was less variation in use (Ireland 38/78, 49%; NZ 28/72, 39%; Australia 78/211, 37%). Range-of-motion exercise was recommended by 40% (145/361) of physiotherapists surveyed, focusing on the hip joint (212/361, 59%) and lumbar spine (168/361, 47%).

**Manual Therapy /Massage**

Massage was administered either ‘always’ or ‘often’ by 57% (206/361) of respondents, most commonly for the gluteal muscles (258/361, 71%), ITB (196/361, 54%), tensor fascia lata (147/361, 41%) and lumbar spine (104/361, 29%). Manual therapy was applied less often, with Mulligan Mobilisation with Movement utilised ‘always’ or ‘often’ by 60/361 (17%), compared to Maitland techniques (47/361; 13%) and muscle energy techniques (55/361; 15%). There was an inter-country difference in the use of manual therapy for the hip joint (p=0.04), with fewer physiotherapists selecting ‘always’ or ‘often’ in Australia (108/211, 51%), compared with NZ (51/72, 71%) and Ireland (55/78, 71%) (Appendix 5).

**Use of Corticosteroid Injection (CSI)**
The frequency of referral (or administration by physiotherapists) for CSI, was consistent across countries. The maximum number of CSIs that respondents recommended per annum was: one, (61/361, 17%); two (121/361, 34%); three (82/361, 23%) and six (4/361, 1%). Respondents’ beliefs regarding the purpose of CSI are outlined in Figure 5. Other roles of CSI based on free-text responses were as a differential diagnosis for hip/lumbar spine pathology and indicated only when there was a significant associated bursitis.

**INSERT FIGURE 5 HERE**

Fifty-seven percent (205/361) of respondents were very confident in treating GTPS, with no significant inter-country variation (Australia 132/211, 63%; New Zealand 32/72, 44%, Ireland 41/78; 53%). A total of 42% (153/361) were somewhat confident and three respondents (<1%) were not very confident.

**Evaluation of Outcomes**

The most common patient-reported outcome was a visual analogue or numeric rating pain severity score (285/361, 79%), followed by the Patient-Specific Functional Scale (166/361, 46%) [22] and the Lower Extremity Functional Scale (85/361, 24%) [23]. The GTPS-specific patient-reported outcome (VISA-G) [24] was used by just 7% (27/361) of respondents. Most common physical impairments reassessed were single leg stance (246/361, 68%) and gait (208/361, 58%), with hip abduction manual muscle testing used by 46% (167/361) and hip abductor dynamometry by 11% (38/361) of respondents (Appendix 6).

Most respondents (292/361, 81%) reported successful outcomes based on a Global Rating of Change score of ‘much better’ or ‘very much better’ while 19% (68/361) reported ‘somewhat better’ as a typical outcome of treatment of patients with GTPS. There was no significant difference in responses between the three countries ($\chi^2=10.68$, $p=0.09$).

**Discussion**
Consistent with current recommendations and evidence regarding known impairments in this patient population, physiotherapists in Australia, NZ and Ireland routinely provide education and prescribe exercise for managing GTPS, most commonly strengthening and neuromuscular control exercises. These findings are in concordance with a recently published survey of practice of physiotherapists in the United Kingdom [10]. Isometric exercise is regularly employed, aligning with respondents’ high ranking of pain relief in treatment goals and reported potential usefulness of isometric exercise for pain relief [25, 26]. Concentric-eccentric exercise is selected more commonly than either mode alone, reflecting the lack of evidence that isolating one of these modes is more advantageous in the management of GTPS [27, 28]. The more frequent selection of weightbearing compared to non-weightbearing exercise is supported by electromyographic studies of GMed/GMin and GMax [29, 30].

A primary focus on hip abductor muscle strengthening is in line with evidence available at the time of the survey regarding hip abductor weakness [13, 14, 31] and atrophy [32, 33] associated with GTPS, and subsequently published high-quality RCT evidence [18]. While evidence is lacking for hip extensor and external rotator weakness [14, 17] in this population, there is clinical plausibility for the common practice of prescribing GMax and lateral rotator strengthening. Activation of these muscles during the loading phase of gait [34, 35] may aid in dispersing ground reaction forces and reducing excessive hip internal rotation [36], potentially lowering loads imparted to the abductor tendons.

Adequate trunk muscle strength is required for control of frontal plane pelvic kinematics during walking which are impaired in GTPS [16]. However, no evidence exists regarding trunk muscle impairments and relationships with altered kinematics in GTPS. While at least 50% of physiotherapists prescribed trunk strengthening, it is unclear if targeted strengthening is required or if deficits are adequately addressed within functional neuromuscular training. Similarly, it is currently
unknown whether this population has weakness in the quadriceps and calf muscles or, if present, whether weaknesses may be sufficiently ameliorated by the general weightbearing strengthening (with infrequent targeted) exercise prescribed by most surveyed physiotherapists.

Neuromuscular retraining of function and gait was considered important by approximately 80% of physiotherapists, reflecting alterations in kinematics and muscle recruitment in gait, SLS and stair climbing associated with GTPS [15-17, 36, 37]. About 40% of physiotherapists regularly consider landing control, consistent with the generally lower physical requirement of patients presenting with GTPS.

Approximately 30% of respondents prescribe iliotibial Band (ITB) stretches and 50% report targeting the ITB with massage. Importantly, stretches that include hip adduction may be provocative due to the concomitant compressive load applied to the soft tissues overlying the greater trochanter [38]. ITB and gluteal stretches that include hip adduction are therefore not recommended [39]. Furthermore, there is no evidence that this population has reduced ITB length or hip adduction range, and any change in range is more likely imparted by changes in the local muscular connections of the ITB [40] and deeper GMed/GMin musculature, rather than in the ITB itself. The evidence therefore does not currently support adjunct treatments for GTPS that target the ITB; however, this does not seem to have translated into clinical practice.

The rationale for the use of joint-based manual therapy and exercises in the management of GTPS is unclear. Despite being instructed to ‘try and base your answers as best you can on the assumption that the patient has an isolated soft tissue pathology at the greater trochanter’, 40% of respondents reported prescribing ROM exercises and approximately 20% provide some form of joint-based manual therapy, predominantly for the hip and lumbar spine. As GTPS does commonly co-present with hip joint pathology and low back pain [41, 42] respondents may find it difficult to distinguish
their treatment of soft tissue pathology alone. Conversely, physiotherapists may use joint-based manual therapy to impart a neurophysiological response for short-term pain relief and/or to establish rapport with the patient. However, there is currently no evidence to support the use of joint-based techniques for GTPS.

Thermal agents were used by 50% of respondents, and 25% utilised electrotherapy, although there was inter-country variation in use. This reflects a distinct disparity in beliefs around the use of electrotherapy for GTPS, for which there is poor evidence. Thirty to 40% of all physiotherapists surveyed also reported using dry needling, for which there is limited evidence [20], and acupuncture or taping, for which there is no evidence. Selection of some relevant adjunct treatment could perhaps be defended for pain-relief and optimising patient rapport. When adjunct treatments are employed, it is imperative the patient is provided with clear education regarding the primary management plan (load management and exercise) and the limited role passive treatments are likely to play in longer-term recovery [43].

The role of CSI in GTPS is controversial and in this survey, approximately 60% of physiotherapists never or rarely recommended CSI to patients. However, the remaining 40% most commonly recommended up to 2-3 CSIs per patient/per annum, mostly to provide pain relief and a window of opportunity for exercise. While there is good evidence that CSI produces short-term relief of lateral hip pain [44, 45], there are concerns regarding the effect of corticosteroids on tendon health [46] and tenocyte response to exercise therapy [43]. With recent RCT evidence reporting better short- and long-term outcomes of an education and education approach compared with CSI [18], physiotherapists may now be more confident in recommending physiotherapy without CSI, as the first-line treatment for GTPS.
Although 81% of respondents reported typically successful outcomes, of the two recent RCTs, the LEAP trial achieved a participant-reported 77% success rate with 14 face-to-face physiotherapy sessions [18] and GLOBE trial achieved participant-reported 58% success with four physiotherapy sessions [19], on the Global Rating of Change score. Both achieved relatively high adherence rates. Typical number of sessions and adherence rates in clinical practice are unknown, but caution should be applied as it is possible that respondents overestimate treatment benefit [47]. In this survey, physiotherapists tended to rely on a patient’s rating of pain severity as their primary patient-reported outcome measure. While this can be useful in determining short-term outcomes, it appears less reflective of global rating of change in the longer term [18]. Few physiotherapists appear to have adopted a Global Rating of Change score or the condition-specific VISA-G score [24] in clinical practice. Furthermore, standardised objective physical measures are not commonly employed; with visual assessment of single leg stance and gait most commonly used. It is reassuring that across all countries, physiotherapists chose education and exercise as primary approaches for the management of GTPS which is now supported by high quality evidence [18, 19]. The types of exercises employed vary considerably which may reflect the generally individualised nature of exercise prescription within clinical practice. There remains inadequate evidence to support one specific exercise or exercise approach over another. Further research is required to determine types and levels of intervention that might be most appropriate for patients with differing levels of severity or comorbid musculoskeletal, general health or psychological conditions.

Some limitations to this research should be noted. Whilst this study provides the first detailed information on physiotherapy management approaches for GTPS in Australia, NZ and Ireland, as with any survey, results only reflect a small proportion of practicing physiotherapists and these are specific to professional association members. As previously discussed, two high-quality RCTs have since been published [18, 19] which support exercise and load management, and these could have an influence on responses should this study be repeated.
Conclusion

This international survey establishes current physiotherapy management of GTPS. The primary approach reported consistently was education and exercise, most commonly strengthening and neuromuscular control exercises. However, a large proportion of physiotherapists surveyed prescribe ITB stretches and target the ITB with manual therapy, where evidence exists that an ITB stretch could potentially be provocative. Evidence regarding the efficacy of an education and exercise approach and superiority over CSI has only become available since the administration of this survey. Researchers should further define the optimal management approach, educators should work to translate the substantial evidence base now available and clinicians should strive to actively seek high-quality information for management of GTPS to ensure optimal outcomes.

Funding

No funding was received for this study.

Ethics Approval

Ethics approval was provided by the research ethics committees at the University of Canberra, Australia (REC1346b); University of Otago, New Zealand (D17/062); and, the Royal College of Surgeons in Ireland (REC1346).

Conflict of Interest

No authors have a stated conflict of interest.

Acknowledgements

The authors thank those physiotherapists who gave valuable feedback on the questionnaire content during the pilot phase and all those who gave their time to complete the survey.

Contribution of the Paper
• This is the first known international survey of physiotherapy practice of GTPS.

• Education and exercise are used by all physiotherapists which is supported by recent evidence.

• Massage was used by 90% of respondents and 40% of respondents recommended corticosteroid injection.

• Whilst education and exercise are supported by recent evidence, other interventions commonly used require evaluation regarding their effectiveness.
References


Figure Legends

Figure 1: Education topics used by respondents (presented as percentage of respondents, n=361)

Figure 2: Types of exercise prescribed for GTPS (presented as percentage of respondents, n=361)
Figure 3: Muscles targeted for strengthening (presented as percentage of respondents, n=361)

GMax: gluteus maximus; GMed/Min: gluteus medius/minimus; Quads: quadriceps

Figure 3: Muscles targeted for strengthening (presented as percentage of respondents, n=361)

Figure 4: Types of neuromuscular control exercise (presented as percentage of respondents, n=361)

Figure 4: Types of neuromuscular control exercise (presented as percentage of respondents, n=361)
Figure 5: Perceived role of corticosteroid injection for GTPS (presented as percentage of respondents, n=361)
Table 1: Professional and demographic profile of respondents (n=361)

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<tr>
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<th>Australia (n=211)</th>
<th>New Zealand (n=72)</th>
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*respondents may have given more >1 answer option
IQR, interquartile range; MSc, Masters of Science; PhD, Doctor of Philosophy; SD, standard deviation
Table 2: Physiotherapy interventions used for GTPS

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<td>361 (100%)</td>
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<td>Exercise</td>
<td>211 (100%)</td>
<td>72 (100%)</td>
<td>77 (98.7%)</td>
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<td>Manual Therapy/Massage</td>
<td>194 (92%)</td>
<td>65 (90%)</td>
<td>66 (85%)</td>
<td>325 (90%)</td>
</tr>
<tr>
<td>Thermal Modalities</td>
<td>106 (50%)</td>
<td>32 (44%)</td>
<td>41 (53%)</td>
<td>179 (50%)</td>
</tr>
<tr>
<td>Taping</td>
<td>83 (39%)</td>
<td>32 (44%)</td>
<td>21 (27%)</td>
<td>137 (38%)</td>
</tr>
<tr>
<td>Electrophysical Agents</td>
<td>54 (7%)</td>
<td>12 (17%)</td>
<td>25 (32%)</td>
<td>91 (25%)</td>
</tr>
</tbody>
</table>
Table 3: Strengthening exercise formats used (n=361)

<table>
<thead>
<tr>
<th></th>
<th>Australia (n=211)</th>
<th>New Zealand (n=72)</th>
<th>Ireland (n=78)</th>
<th>Total (n=361)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Isometric</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>78 (37%)</td>
<td>19 (26%)</td>
<td>16 (21%)</td>
<td>113 (31%)</td>
</tr>
<tr>
<td>Often</td>
<td>77 (36%)</td>
<td>25 (35%)</td>
<td>35 (45%)</td>
<td>137 (38%)</td>
</tr>
<tr>
<td><strong>Concentric only</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>5 (2%)</td>
<td>4 (6%)</td>
<td>5 (6%)</td>
<td>14 (4%)</td>
</tr>
<tr>
<td>Often</td>
<td>18 (9%)</td>
<td>9 (13%)</td>
<td>12 (15%)</td>
<td>39 (11%)</td>
</tr>
<tr>
<td><strong>Eccentric only</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>6 (3%)</td>
<td>2 (3%)</td>
<td>3 (4%)</td>
<td>11 (3%)</td>
</tr>
<tr>
<td>Often</td>
<td>19 (9%)</td>
<td>10 (14%)</td>
<td>11 (14%)</td>
<td>40 (11%)</td>
</tr>
<tr>
<td><strong>Eccentric and Concentric</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>61 (29%)</td>
<td>22 (31%)</td>
<td>19 (24%)</td>
<td>102 (28%)</td>
</tr>
<tr>
<td>Often</td>
<td>99 (47%)</td>
<td>30 (42%)</td>
<td>36 (46%)</td>
<td>165 (46%)</td>
</tr>
<tr>
<td><strong>Isokinetic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>8 (4%)</td>
<td>4 (6%)</td>
<td>3 (4%)</td>
<td>15 (4%)</td>
</tr>
<tr>
<td>Often</td>
<td>21 (10%)</td>
<td>8 (11%)</td>
<td>6 (8%)</td>
<td>35 (10%)</td>
</tr>
<tr>
<td><strong>NWB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>29 (14%)</td>
<td>19 (26%)</td>
<td>15 (19%)</td>
<td>63 (17%)</td>
</tr>
<tr>
<td>Often</td>
<td>74 (35%)</td>
<td>23 (32%)</td>
<td>26 (33%)</td>
<td>123 (34%)</td>
</tr>
<tr>
<td><strong>WB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>75 (36%)</td>
<td>24 (33%)</td>
<td>28 (36%)</td>
<td>127 (35%)</td>
</tr>
<tr>
<td>Often</td>
<td>103 (49%)</td>
<td>34 (47%)</td>
<td>38 (49%)</td>
<td>175 (48%)</td>
</tr>
</tbody>
</table>

NWB, Non-Weight Bearing; WB, Weight-Bearing