Pain Free Grip Strength test

Description

The pain-free grip (PFG) test is used to measure the amount of force that the patient generates to the onset of pain; when there is no pain the test result could be regarded as maximum grip strength. It is commonly performed in patients with lateral epicondylalgia (LE). LE is characterised by the presence of pain over the lateral humeral epicondylic which is provoked by at least two of: gripping, resisted wrist or middle finger extension, or palpation (Stratford et al 1993) in conjunction with reduced PFG over the affected side (Stratford et al 1993; Vicenzino et al 1996; Vicenzino et al 1998). Therefore, PFG is measured clinically in LE since gripping tasks are reported to reproduce the patient’s lateral elbow pain (Vicenzino et al 2007). The PFG should be used before and following an intervention to evaluate treatment effects and to monitor the progress of LE condition.

PFG is measured using a grip dynamometer in a relaxed supine position with legs straight and feet apart. The tested elbow is then positioned in an extended and pronated position (Smidt et al 2002). PFG has also been reported to be measured in sitting with the elbow in 90 degree flexion supported (Balogun et al 1991; Hillman et al 2005). The participant is instructed to squeeze the dynamometer maximally over the unaffected side at a gradual rate. This is followed by squeezing the dynamometer on the affected side. The patient is asked to grip the dynamometer at the same rate as the unaffected side but to stop when pain is experienced. The clinician observes for any attempt to generate a quick force while squeezing the grip dynamometer. This is to avoid squeezing the dynamometer beyond the onset of pain rendering the test invalid. The clinician should ensure that the elbow is kept consistently in the same extended and pronated position during subsequent testing within the same testing session since PFG strength testing performed in varying elbow positions can potentially yield different results (Mathiowetz et al 1985). The handle of a grip dynamometer typically allows adjustment of grip size. Therefore, the same grip size should be set up if the same patient is being tested during repeated measurements and over different occasions. It is advised to repeat the testing three times with 1 minute rest intervals (Watanabe et al 2005). The average of these three repetitions should be used for comparison between the unaffected and affected sides.

Reliability and validity: PFG is highly reliable (ICC > 0.97) and it correlates with disability and perceived improvement in LE populations (Stratford et al 1989; Stratford et al 1994). PFG has also been reported to correlate with pain and disability rated on the Patient Rated Tennis Elbow Evaluation score (r = ~0.36) (Overend et al 1999). In addition, the construct validity of data obtained with the PFG force measure and its sensitivity to detect change over time in people with LE were also studied (Stratford 1987). Here, the PFG force measurements correlated with self-perceived pain-free function (R= 0.68) and with function levels as measured by a visual analog scale (R = 0.66) (Stratford 1987). The PFG force measurements also correlated moderately with pain as measured on a visual analog scale (R=0.47) (Stratford 1987). These data implied sound construct validity for PFG force as a measure used in LE (Paungmali et al 2003).

Commentary

The PFG test is simple to carry out as it can be conducted in a few minutes with minimal equipment and will quantify the extent of grip strength deficit in LE during clinical practice. It can also assist with the assessment of muscle strength in older adults with sarcopenia (Roberts et al 2011). It is a reliable and valid test to measure grip strength deficit in LE. PFG testing can be carried out in either sitting or supine as long as the posture is kept standardized during the testing session. The use of PFG testing has enabled the study of treatment efficacy for LE in clinical trials. For example, Bisset and co-workers (2006) showed that physiotherapy combining elbow manipulation and exercise has a superior benefit to wait and see in the first six weeks and to corticosteroid injections after six weeks, providing a reasonable alternative to injections in the mid to long term for LE patients (Bisset et al 2006). It is recommended that the PFG should be used in both research and clinical practice (Smidt et al 2002).

Edwin Choon Wyn Lim
Department of Physiotherapy, Singapore General Hospital, Singapore

References

**Chronic Pain Grade Questionnaire**

**Description**

The Chronic Pain Grade Questionnaire (CPGQ) is a seven-item instrument designed to evaluate overall severity of chronic pain based on two dimensions, pain intensity and pain-related disability, in individuals who suffer from chronic pain that has lasted for at least six months. The notion of graded classification of chronic pain severity was derived from the dysfunctional chronic pain concept provided by Turk and Rudy (1988). The two disability items were adopted from the Multidimensional Pain Inventory (Von Korff et al 1992). The CPGQ was designed such that the graded classification corresponds to the qualitative difference in global severity amongst patients with chronic pain (Von Korff et al 1990, Von Korff et al 1992). CPGQ has been translated into English (UK), German, Italian and Chinese languages and is available from the original reference and/or by contacting the authors directly.

The responses on the 7 items are used for computing the scores for the 3 subscales of the CPGQ: characteristic pain intensity, disability score, and disability points. The characteristic pain intensity score ranges from 0 to 100 and is evaluated by calculating the mean of pain intensities reported for current pain status, as well as the worst and the average pain in last 6 months. The disability score (0–100) is based on the mean ratings of how much the pain has interfered in performing activities of daily living, work and social activities in the last 6 months. The disability points are scored 0–3 and are derived from a combination of ranked categories of the number of disability days (the number of days that the respondent was away from usual activities in the last 6 months due to pain) and disability score. Based on these scores, the respondent’s chronic pain disability status can then be classified into one of the 5 hierarchical categories of chronic pain/disability: no pain (Grade 0), low disability and low intensity (Grade I), low disability and high intensity (Grade II), high disability and moderately limiting intensity (Grade III), high disability and severely limiting intensity (Grade IV) (Von Korff et al 1992).

**Reliability, validity and responsiveness:** CPGQ was originally administered via telephone interviews for patients with back pain, headache, and temporomandibular joint pain. However, subsequent research has expanded its utility in postal surveys in general population and chronic musculoskeletal pain. It was found to have good correlation with the equivalent dimensions of SF-36 questionnaire; highest for pain and least for mental health dimension (convergent validity). Factor analyses demonstrated that all the seven items contributed significantly to the explained variance (> 75%) (Smith et al 1997). Furthermore, moderate to good internal consistency (Cronbach’s alpha, 0.74 to 0.91) and good test retest reliability has been demonstrated in primary care patients with back pain (weighted kappa –0.81, 95% CI 0.65 to 0.98) (Smith et al 1997). A study by Elliot et al showed that changes in CPGQ score over a period of time in patients with chronic musculoskeletal pain correlated significantly with changes in SF-36 scores (Elliot et al 2000). Responsiveness statistics and minimal clinically important difference (MCID) of the CPGQ have not been reported in the literature.

**Commentary**

CPGQ is a reliable and valid measure for evaluation of chronic pain in the general population as well as in the primary health care setting. A recent study demonstrated that even though CPGQ was developed prior to the WHO International Classification of Functioning, Disability & Health (ICF), it measures all the ICF outcomes i.e, impairment, activity limitation and participation restriction (Dixon et al 2007). This is the most significant advantage of CPGQ over many other pain questionnaires as it not only evaluates the severity of chronic pain but also examines its impact on activity and participation. Individuals with chronic pain often experience significant functional impairment as well as difficulty in occupational/ social roles. The CPGQ may not provide a comprehensive assessment of how ongoing pain affects the functions and participation in life roles; however it can be utilised as a preliminary assessment tool to ascertain the extent of disablement resulting from chronic pain. Further research is required to determine if the 5 categories of CPGQ allow thorough and consistent discrimination of pain severity and disability among individuals with varying degree of pain/ disablement. Hence, CPGQ with further validation can facilitate individualised management tailored according to the clinical subgroup of the patient (high pain versus high disability). Lastly, responsiveness and MCID of the subscales of the CPGQ need to be established in prospective longitudinal studies.

**References**