The VISA score: An index of severity of symptoms in patients with jumper's knee (patellar tendinosis)

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ABSTRACT

Symptoms of jumper's knee (patellar tendinosis) are not easily quantitated and this may explain why there are no evidence-based guidelines for managing the condition. A simple, practical questionnaire-based index of severity would facilitate jumper's knee research and subsequently, clinical management. Thus we devised and tested the Victorian Institute of Sport Assessment (VISA scale) questionnaire. The brief questionnaire assesses (i) symptoms, (ii) simple tests of function and (iii) ability to undertake physical activity. Six of the eight questions are scored on a visual analogue scale from 0-10 with 10 representing optimal health. The maximal VISA score for an asymptomatic, fully performing individual is 100 points and the theoretical minimum is 0 points. We found the VISA scale to have excellent short-term test-retest, and inter-tester reliability (both, r_0.95) as well as good short-term (one week) stability (r=0.87). Mean (SD) of the VISA scores ranged from 95 (8) points in asymptomatic control subjects to 55 (12) points in patients who presented to a sports medicine clinic with jumper's knee and 22 (17) points in patients before surgery for chronic jumper's knee. Six- and twelve-months after surgery VISA scores returned to 49 (15) and 75 (17) points respectively, mirroring clinical recovery. We conclude that the VISA score is a reliable index of the severity of jumper's knee that has potential to aid clinicians and researchers.

INTRODUCTION

Galileo said "measure what can be measured and make measurable what cannot be measured". Clinical conditions in which severity can readily be measured (e.g. hypertension, hypercholesterolaemia, diabetes mellitus) generally have fairly specific guidelines for treatment and efficacy of treatment is easily assessed. Such conditions lend themselves to research because outcome measures can be clearly defined. The severity of jumper's knee

(patellar tendinosis), the clinical syndrome of anterior knee pain associated with tenderness at the inferior pole of the patella (Blazina 1973, Khan 1996), is not easily quantitated.

Jumper's knee is due to degenerative tearing of collagen fibres - it is not merely an inflammatory condition (Khan 1996, Khan submitted). It causes substantial morbidity in sportspeople (Cook 1997, Kannus 1997) and also in some occupations. The range of treatments for patients with jumper's knee includes rest, ice, electrotherapy, massage, concentric exercise prescription, eccentric exercise prescription, taping, corticosteroid injection and surgery (Brukner 1993). There are, however, no evidence-based guidelines as to when each of these therapies should be prescribed (Sandmeier 1997) and few studies even report outcome of conservative therapies (Karlsson 1992, Cook 1997)

Biochemical tests, imaging and questionnaires are all commonly used in medicine to measure outcome of treatment. At present there are no blood or urine markers of collagen turnover that have proven useful in monitoring the state of tendon tissue. Ultrasonography does not provide a reliable guide to whether or not the patellar tendon is clinically healed (Khan 1997, Cook 1998). There are several questionnaire-based methods that can be used to measure the severity of jumper's knee but none are ideal.

Blazina's method of grading severity of jumper's knee was designed specifically for patients with jumper's knee (Blazina 1973). The classification represented a positive step in describing jumper's knee but its usefulness is limited by having only 3 categories (the fourth is for ruptured patellar tendon). Thus, some patients with markedly differing symptoms of jumper's knee, (and varying prognoses and requiring differing treatment) are in the same category.

An alternative method that could be used to record severity of jumper's knee is the 7-point Nirschl pain scale that was devised as a result of studies of elbow pathology (Nirschl 1992). This scale has recently been changed to a 6-point scale (Ollivierre 1995). This scale differentiates patients more than does the Blazina scale, but does not truly measure functional capacity and is not specific for jumper's knee.

The visual analogue scale used by Flandry to quantitate subjective knee symptoms irrespective of the diagnosis (Flandry 1991, Hoher 1995) could be used in patients with jumper's knee. However, it is not ideal for that purpose as it has 7 questions concerned with swelling, locking and giving way and with 28 questions it is unlikely to gain acceptance in clinical practice.

The well-known Cincinnati (Noyes 1985) and Lysholm (Lysholm 1982) knee scales that measure the severity of knee instability are not designed to assess the severity of jumper's knee. Even patients with severe jumper's knee symptoms demonstrate little disability according to the Cincinnati and Lysholm scales. The inventors of the Lysholm scale themselves emphasised the need for "different or modified scoring scales for the follow-up of patients with different diagnoses" (Lysholm 1982). Thus, we empirically devised and tested a simple questionnaire-based instrument to measure severity of jumper's knee.

MATERIALS AND METHODS

The Victorian Institute of Sport Assessment (VISA) scale (Table 1) was used to assess (i) symptoms, (ii) simple tests of function and (iii) ability of subjects to undertake sport. Six of the eight questions were scored on a visual analogue scale from 0-10 with 10 representing optimal health. Visual analogue scales have been widely used and validated for both pain and function (Huskisson 1974, Huskisson 1976, Scott 1977, Downie 1978, Melzack 1983, Price 1983,

Harms-Ringhdahl 1986). The theoretical maximal VISA score for an asymptomatic, fully performing individual is 100 points and the theoretical minimum is 0 points.

Insert Table 1 around here.

Test-retest and inter-tester reliability studies were each performed on the same day. Short-term (one week) stability was tested by one observer. Results were analysed using Pearson's r correlation. As there is no biochemical or imaging gold standard for the diagnosis of jumper's knee and as the VISA score is not designed to distinguish jumper's knee from other causes of anterior knee pain validity was not tested.

The VISA questionnaire was administered to the following subjects: (i) asymptomatic controls who were members of the university population, (ii) patients who presented to a sports medicine clinic with symptoms unrelated to their knees, (iii) elite basketballers who were competing fully in the national league (current or past history of jumper's knee were not exclusion criteria), (iv) patients who presented to a sports medicine clinic with jumper's knee and (v) patients before and after surgery for chronic jumper's knee. Where patients from the various groups had also completed the Nirschl pain scale (Nirschl 1992) at the same time as the VISA score, we tested the correlation of these rating scales using Pearson's r correlation coefficient. We compared the means of the VISA scores of patients presenting to the sports medicine clinic without jumper's knee, the patients with jumper's knee and the patients about to undergo surgery for jumper's knee using one-way ANOVA. We compared the preoperative and 12-month post-operative patients' VISA scores using the paired t-test.

RESULTS

Reliability

The VISA score was highly reproducible over a range of values for both test-retest and inter-tester scoring (r>0.95). In addition the scale was stable over a one week period (r=0.87) (Table 2).

Table 2. Reproducibility of VISA scores.

	no. of subject tendons	Mean age (SD) years	Mean VISA score[1] (SD)	Mean deviation between tests (points)	Pearson r
Test-retest (all subjects tested)	54	28(8)	92 (14)	0	0.99
Test-retest (subset: only tendons with VISA <80)	11	28 (10)	69 (15)	1	0.99
Inter-tester (all subjects tested)	47	28 (8)	91 (15)	0	0.99
Inter-tester (subset: only tendons with VISA <80)	12	27 (9)	70 (15)	1	0.95
Stability (all)	9	30 (10)	85 (11)	1	0.87

[1]First mentioned test

Scores in sample populations

The mean VISA score varied between groups of subjects (Table 3). There was a significant difference in the VISA score of individuals before and at each time point after surgery ($p<0.05$) (Table 3). There was a significant difference between the normal volunteers, the jumper's knee patients (clinic) and the immediately preoperative patients ($p<0.05$, ANOVA).

Table 3. Mean (SD) age, VISA score and Nirschl scores and the VISA/Nirschl correlation in different groups of individuals

Subject group	Number of knees scored	Age of subjects	VISA score	Nirschl score	Correlation: VISA score & Nirschl score
Normal volunteers	26	31 (9)	95 (8)	0.3 (0.8)	-0.93
Sports clinic patients without jumper's knee	26	27 (7)	92 (13)	0.2 (0.7)	-0.47
Elite basketball players	100	24 (6)	93 (11)	-	-
Jumper's knee patients (clinic)	14	25 (6)	55 (12)	3.0 (1.8)	-0.74
Presurgical patients	15	31 (9)	22 (17)	6.2 (0.9)	-0.76
Post-surgical patients (6m)	15	32 (9)	49 (15)	3.2 (1.9)	-0.71
Post-surgical patients (12m)	15	32 (9)	75 (17)	1.6 (1.8)	-0.69

DISCUSSION

Our data suggest that the VISA scale is a reliable tool for measuring the severity of jumper's knee. We believe its reliability reflects the uncomplicated nature of the questions and the use of the visual analogue system that has been

shown to be reliable in questionnaires (Downie 1978, Melzack 1983, Hoher 1995).

Although the mean VISA scores of asymptomatic individuals and symptomatic patients we studied differed, the VISA scale is *not* a diagnostic test. We emphasise that patients with conditions affecting the knee other than patellar tendinosis, particularly patellofemoral pain (McConnell 1986), will not achieve high VISA scores. Furthermore, the questionnaire is inappropriate in individuals who cannot perform functional tests because of other limitations (e.g., back pain). However, the questions in the VISA scale that test functional performance particularly distinguish this measurement instrument from others and provides the questionnaire with sensitivity necessary to reflect subtle changes in symptoms of jumper's knee.

We expect that the VISA scale to be a more sensitive research tool for monitoring postoperative recovery than a three or a seven point scale. However, when broad categories are required, VISA scores can be categorised (e.g. <60, 61-80 and 81-100).

If the VISA score is adopted by researchers in this field, it would mean that with appropriate pre-planning, results of studies carried out at various centres could be compared and perhaps pooled for meta-analysis. This has the potential to lead to the development of clinical treatment guidelines based on patients' VISA scores. Modifications of the VISA questionnaire could also form the basis of scoring systems to grade other common tendinopathies.

We conclude that clinical scoring scales are essential in order to obtain clincal data in a time-efficient manner without observer bias. Such data can then be analysed statistically. The VISA scale is as a simple, reliable instrument for measuring the severity of jumper's knee.

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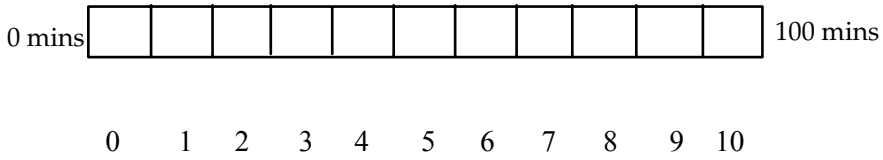
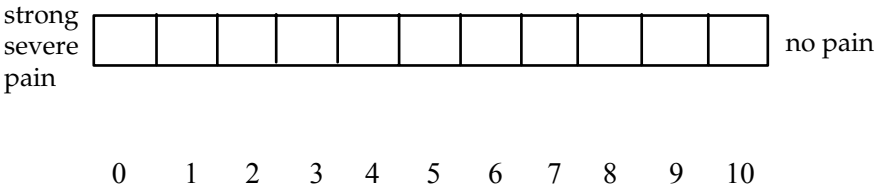
ASSESSMENT SCALE

1. For how many minutes can you sit pain free?



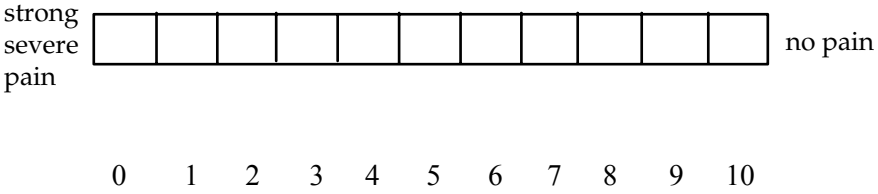
POINTS ❐

2. Do you have pain walking downstairs with a normal gait cycle?



POINTS ❐

3. Do you have pain at the knee with full active nonweightbearing knee extension?



POINTS ❐

4. Do you have pain when doing a full weight bearing lunge?

strong severe pain ☐☐☐☐☐☐☐☐☐☐ no pain

POINTS ❐

0 1 2 3 4 5 6 7 8 9 10

5. Do you have problems squatting?

POINTS ❐

unable ☐☐☐☐☐☐☐☐☐☐ no problems

0 1 2 3 4 5 6 7 8 9 10

6. Do you have pain during or immediately after doing 10 single leg hops?

POINTS ❐

strong severe pain/unable ☐☐☐☐☐☐☐☐☐☐ no pain

0 1 2 3 4 5 6 7 8 9 10

7. Are you currently undertaking sport or other physical activity?

0 ❐ Not at all

4 ❐ Modified training ± modified competition

7 ❐ Full training ± competition but not at same level as when symptoms began

10 ❐ Competing at the same or higher level as when symptoms began

POIN ❐

8. Please complete **EITHER A, B or C** in this question.

- If you have **no pain** while undertaking sport please complete **Q8a only**.
- If you have **pain while undertaking sport but it does not stop you** from completing the activity, please complete **Q8b only**.
- If you have **pain that stops you from completing sporting activities**, please complete **Q8c only**.

8a. If you have **no pain** while undertaking sport, for how long can you train/practise?

POINTS

NIL	1-5 mins	6-10 mins	7-15 mins	>15 mins	❒
❒	❒	❒	❒	❒	
0	7	14	21	30	

OR

8b. If you have some pain while undertaking sport, but it does not stop you from completing your training/practice for how long can you train/practise?

POINTS

NIL	1-5 mins	6-10 mins	7-15 mins	>15 mins	❒
❒	❒	❒	❒	❒	
0	4	10	14	20	

OR

8c. If you have **pain which stops you** from completing your training/practice for how long can you train/practise?

					POINTS
NIL	1-5 mins	6-10 mins	7-15 mins	>15 mins	❒
❒	❒	❒	❒	❒	
0	2	5	7	10	

TOTAL VISA SCORE ❒

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