The role of the Pirani scoring system in the management of club foot by the Ponseti method

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The Pirani scoring system, together with the Ponseti method of club foot management, was assessed for its predictive value.

The data on 70 idiopathic club feet successfully treated by the Ponseti method and scored by Pirani’s system between February 2002 and May 2004 were analysed. There was a significant positive correlation between the initial Pirani score and number of casts required to correct the deformity.

A foot scoring 4 or more is likely to require at least four casts, and one scoring less than 4 will require three or fewer. A foot with a hindfoot score of 2.5 or 3 has a 72% chance of requiring a tenotomy.

The Pirani scoring system is reliable, quick, and easy to use, and provides a good forecast about the likely treatment for an individual foot but a low score does not exclude the possibility that a tenotomy may be required.

The Ponseti method of club foot management has been shown to be effective, producing better results and fewer complications than traditional surgical methods. The deformity is reduced by weekly manipulation and plaster casting. Most feet also require a percutaneous Achilles tenotomy. Correction is maintained by a system of boots and a bar. Recent studies suggest that the Ponseti method can be successful in up to 98% of feet.

Club foot scoring systems. There is no agreed method of grading the severity of deformity or monitoring the natural history, but there is a reported need for such a classification, which should be reliable, reproducible, feasible in a clinical setting, and predict appropriate treatment. Pirani et al devised a simple scoring system based on six clinical signs of contracture. Each is scored according to the following principle: 0, no abnormality; 0.5, moderate abnormality; 1, severe abnormality.

The six signs are separated into three related to the hindfoot (severity of the posterior crease, emptiness of the heel and rigidity of the equinus), and three related to the midfoot (curvature of the lateral border of the foot, severity of the medial crease and position of the lateral part of the head of the talus).

Thus, each foot can receive a hindfoot score between 0 and 3, a midfoot score between 0 and 3 and a total score between 0 and 6.

When assessed for inter-observer reliability, the kappa score showed this to be almost perfect and much better than any of previous scoring system. We find it simple and reliable. A foot can be assessed in less than a minute and no technical equipment is required. Although we know the scoring system describes the deformity we do not know whether it can yield any further information such as treatment required, prognosis and outcome.

Scher et al compared Pirani et al and Dimeglio et al scores with the need for a tenotomy. For both systems they established a link between a high-scoring foot and the need for tenotomy. In relation to Pirani, 85% of feet with a score above 5 required tenotomy, significantly more than those that did not (p = 0.0003).

Parents whose children are starting Ponseti treatment are likely to inquire whether a tenotomy will be required. Scher’s study suggests that the Pirani system would answer this question.

Another concern is the number of casts their baby will require. We wondered if the Pirani score would allow the surgeon to give more specific advice.

This study evaluated the Pirani club foot scoring system during the early stages of Ponseti treatment.

Patients and Methods
Between February 2002 and May 2004, 97 babies (149 club feet) were treated by a single
Each week, between casts, the same clinician scored the feet according to the Pirani system.

Complete documentation was available for 47 babies (70 feet) with idiopathic club feet treated purely by the Ponseti method.

The records were studied in relation to the Pirani score and number of weekly casts required. Hind- and midfoot scores were considered separately and a relationship between the initial score and need for tenotomy was sought.

The relationship between the number of casts and the respective Pirani scores was assessed using the Spearman’s rank correlation coefficient with the level of significance set at $p = 0.05$. The relationship between Pirani scores and the need for tenotomy was investigated using the chi-squared test with $p = 0.05$ considered to be significant.

Results

Of the 70 fully corrected feet, the mean number of casts required was 5.31 (2 to 9). Tenotomy was required in 42 feet (60%).

The mean number of casts was 5.31 (2 to 9) for the tenotomy group and 3.63 (2 to 6) for the non-tenotomy group. The former required significantly more plasters ($p < 0.0005$). The midfoot score appears to be correlated with the duration of treatment ($r = 0.72$, $p < 0.0005$), but the hindfoot does not ($r = 0.065$, $p = 0.68$).

There is a significant difference between the mean initial Pirani scores for the tenotomy (4.96; 2 to 6) and non-tenotomy (4; 1 to 6) groups, respectively ($p = 0.012$).

There is no significant difference between the initial midfoot mean values for the two groups ($p = 0.157$).

Discussion

This study shows that the Pirani scoring system can be used to clarify the need for tenotomy and allows an estimate of the number of weekly plaster casts required.

The most striking finding is a strong link between the initial Pirani score and the duration of treatment shown...
graphically and by Spearman’s correlation coefficient. This is the best evidence yet that a more deformed foot requires greater intervention.

This correlation persists when the tenotomy and non-tenotomy groups are compared. In the former, the initial hind- and midfoot scores are important predictors of the duration of treatment. This is not the case for the tenotomy group, in which the midfoot but not the hindfoot score was correlated with the number of casts. This is likely to be a spurious finding because in the tenotomy group the hindfoot score is almost always 2.5 or 3 (Fig. 2) and a correlation over such a narrow range would be unlikely. The midfoot scores remain widely distributed (Fig. 3) and it seems reasonable to conclude that it is these contractures that are related to the length of treatment.

We found no significant linear relationship between the initial Pirani scores and number of casts. However, there seems to be a cut-off point for feet scoring 4 or more. Of these, 92% (48) required at least four plasters, whereas only 11% (2) of feet with a score of less than 4 required four or more plasters (p < 0.0005). This is an easy rule to remember and a useful guide when advising parents.

The study found a significantly higher initial Pirani score in feet requiring a tenotomy, which also required significantly more casts, suggesting that the better feet correct without the need for surgical intervention.

It was also clearly shown that it is the hindfoot rather than the midfoot component of the Pirani score that predicts the need for tenotomy. This is to be expected, as it is the hindfoot equinus that the tenotomy is correcting.

Of the feet with a hindfoot score of 2.5 or 3 at initial scoring, 72% (38) required a tenotomy, compared to 23.5% (4) of those scoring less than 2.5. The scores, although significant, are too variable for confident predictions to be made. One must be careful not to give parents whose children have lower scores the impression that operation will be unnecessary.

We have found the Pirani scoring system to be practicable, reproducible and helpful in the management of idiopathic club feet by the Ponseti method.

**Supplementary Material**

A further opinion by Mr John Fixsen is available with the electronic version of this paper on our website at www.jbjs.org.uk

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

**References**


