Letter to the editor

Bilateral clubfeet: Two feet or one patient *To the Editor*

Medical literature is prone to non-independent observations raising chances of overestimates or underestimates of the within-group variance in studies.¹ In fact, a systemic review on studies published in high-impact-factor orthopaedic journals has highlighted presence of a high proportion (42%) of clinical studies which involve inappropriate use of multiple observations from single individuals and thus potentially biasing results.¹

Traditionally, idiopathic clubfoot studies have been reported as number of feet.² One retrospective Australian study pointed out a high correlation between bilateral feet and cautioned researchers on this potential pairing of data.³ There are adequate regional variations in the clubfoot characteristics in low income countries. We considered it worthwhile to study bilateral clubfeet to evaluate the association between them, if any, in our region too. The parameters we included in our study were precasting Pirani score, number of casts required, pretenotomy Pirani score, pretenotomy dorsiflexion, rate of tenotomy, posttenotomy dorsiflexion achieved and we also tried to find out correlation, if any, among the bilateral feet.

This study was conducted at a CURE Clubfoot Clinic at a paediatric superspecialty centre located in suburb of a low income country. Patient's case files were used for chart review (January–Sept 2016). Being a retrospective study, ethical clearance was not required. Total 58 patients (116 feet) with primary idiopathic bilateral clubfeet were analysed. Patients who had taken prior treatment elsewhere, atypical clubfeet, syndromic or with any comorbidities were excluded. All the included patients were treated with Ponseti technique of weekly casting followed by tenotomy, if required. As per institution's protocol, if one foot was first corrected in bilateral cases, it was recorded and casting continued on both feet until a decision regarding tenotomy/correction on both feet was established.

There were 44 males and 14 females (3.14:1) with average age 5.6 months (range, 0.26–60 months). Forty four patients (75.8%) had same Pirani score in two feet, 12 (20.7%) had difference of 0.5, and one each had difference of 1 and 1.5 respectively. The two feet showed high correlation (Fig. 1) in various parameters analysed: precasting Pirani score [right 5.22 ± 0.72 , left 5.20 ± 0.72 ($R = 0.86$, $p < 0.001$)]; Ponseti casts [right 5.22 ± 1.71 , left 5.07 ± 1.82 ($R = 0.92$, $p < 0.001$)]; pretenotomy dorsiflexion [right -11.33 ± 9.29 , left $-10.03 \pm 9.43^\circ$ ($R = 0.91$, $p < 0.001$)]; pretenotomy Pirani score [right 1.72 ± 0.49 , left 1.70 ± 0.48 ($R = 0.95$,

Fig. 1. a,b) A 1 month child with bilateral clubfeet. The precasting Pirani score of both feet was equal (5.5). c,d,e) The two feet behaved similar with respect number of Ponseti casts (5), pretenotomy Pirani score (1) and pretenotomy dorsiflexion (-10°). Both sides required tenotomy and posttenotomy dorsiflexion (-30°) was achieved.

$p < 0.001$); posttenotomy dorsiflexion [right 20.13 ± 9.72 , left $21.08 \pm 8.68^\circ$ ($R = 0.96$, $p < 0.001$)].

The correlation between two anatomical body parts is always a statistical concern and has been raised many times in medical literature.⁴ Use of paired data has the potential to seriously distort research findings. The results in studies on congenital deformity of clubfoot have classically been expressed in number of feet.² One research group from a high income country reported high correlation within bilateral feet.³ They undertook a retrospective review of 33 children (66 feet). In their series, the precasting Pirani score (right 5.2 ± 0.8 ; left 5.2 ± 0.5) ($r = 0.76$, $p < 0.001$) between feet was similar. The response to intervention in two feet highly correlated in terms of number of casts (right 5.2 ± 1.1 ; left 5.2 ± 1.3) ($r = 0.89$, $p < 0.001$) and Achilles tenotomy (right 17/18; left 16/18) ($r = 0.94$, $p < 0.001$). Further, the 8 patients with relapse required the same intervention to correct it. The authors concluded that bilateral clubfeet should not be considered independent entities for statistical result presentations. Our study too reiterated the similar characteristics and high correlation between two bilateral feet. We, therefore, too suggest that medical researchers and statisticians take clear conceptual and statistical stratification while analysing bilateral clubfeet and avoid false inflation of data.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.jcot.2017.08.004>.

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