

Static Foot Pressure Distribution in Apert Syndrome Patients

Kanlaya Ditthakasem, MNS, RN, CCRP

John C. Kolar, PhD

Dallas Craniofacial Center
Medical City Children's' Hospital
Dallas, Texas

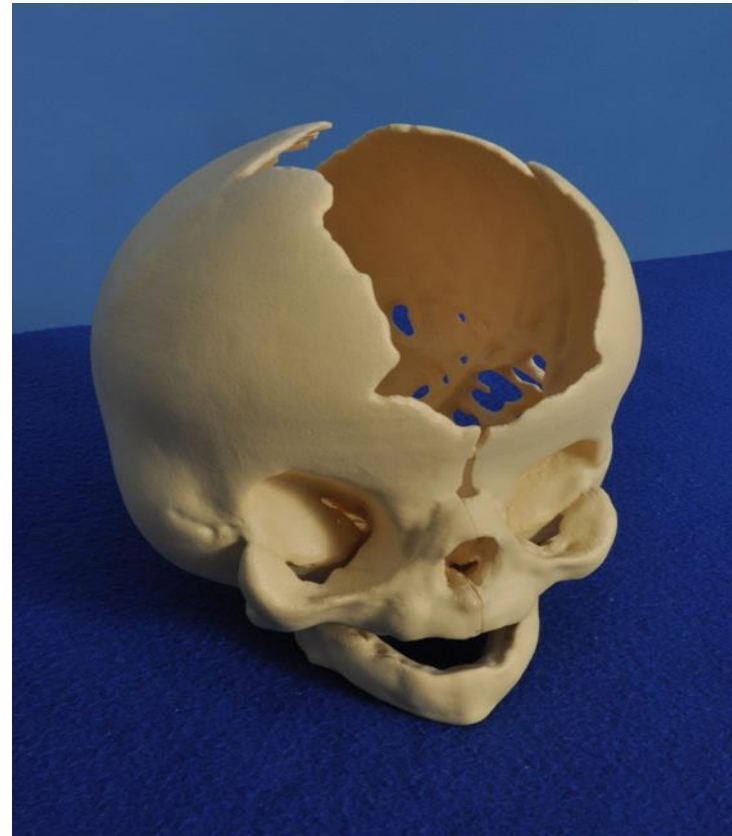
Background

- Apert syndrome is a rare and severe congenital malformation disorder.
- Caused by a mutation of fibroblast growth factor receptor 2 (FGFR2).
- Incidence: 1 in 65,000 live births.

Clinical Presentations:

- Craniosynostosis
- Mid-face hypoplasia
- Underdeveloped upper jaw
- Class III malocclusion
- Syndactyly (fusion) of fingers and toes

Clinical Presentations - Craniofacial Deformities



Clinical Presentations – Hand Deformities



Digits 2-4
fused,
thumb &
little finger
separate



Digits 2-5
fused
("mitten"),
thumb
separate



All 5 digits
fused
("rosebud")

Clinical Presentations – Foot Deformities

Fusion of soft tissue of toes



Digits 2-5 fused,
great toe separate



Digits 1-5 fused

Statement of the Problem

At present, no information exists regarding foot function and plantar pressure in Apert syndrome patients after two-stage syndactyly release for the correction of foot.

Purpose of the Study

- To describes plantar pressure patterns in Apert syndrome patients.

Methodology

- This is a descriptive study which describes plantar pressure patterns in Apert syndrome patients.
- The plantar pressure patterns of the feet of thirty-five patients, aged 4-38 yrs (19 female, 16 male) were measured during barefoot standing, using a HR Mat™ System, a high-resolution pressure distribution measurement platform (TekScan, USA).



Fig. 1. HR Mat™ System (TekScan, USA)

Results

- The average percentage of total body weight on the left foot vs. right foot was 47.74 and 52.45 respectively with average difference of 13.89% between feet.
- 31.43 % (11/35) of patients had a large asymmetry ($\geq 20\%$) in foot contact between the left and right feet.

Results (Cont.)

- Pressure distribution differences between the ball and the heel on both left and right feet was noted, 65.71% (23/35) and 68.57% (24/35) respectively).
- Most patients had higher pressure (weight-bearing) at the heels (82.86% left heels vs. 77.14% right heels).

Results (Cont.)

- Twenty-four of the 35 patients (69%) exhibit a complete lack of lateral arch support in the standing position.

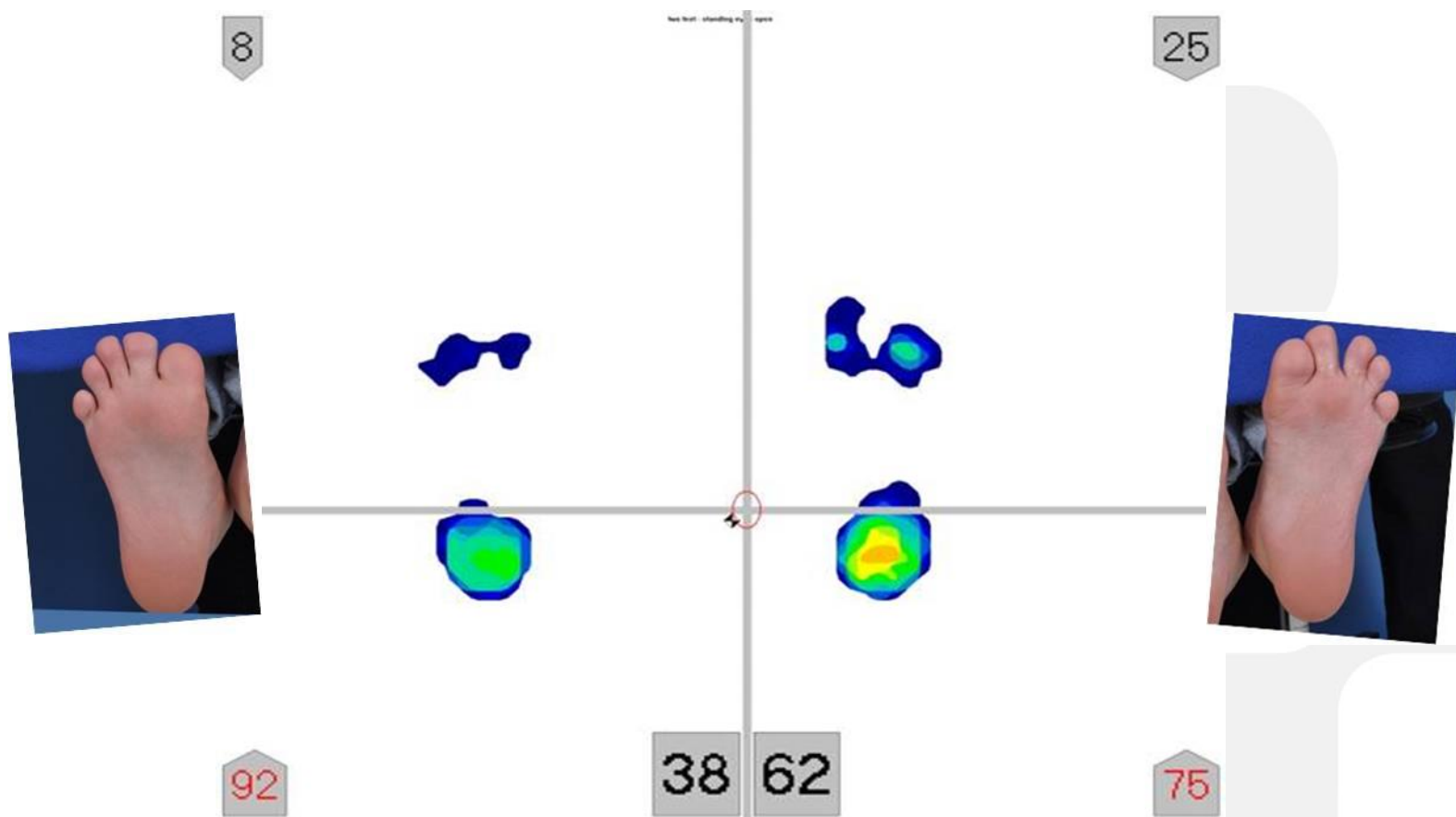


Fig. 2. Foot pressure scans of a 10-year-old male.

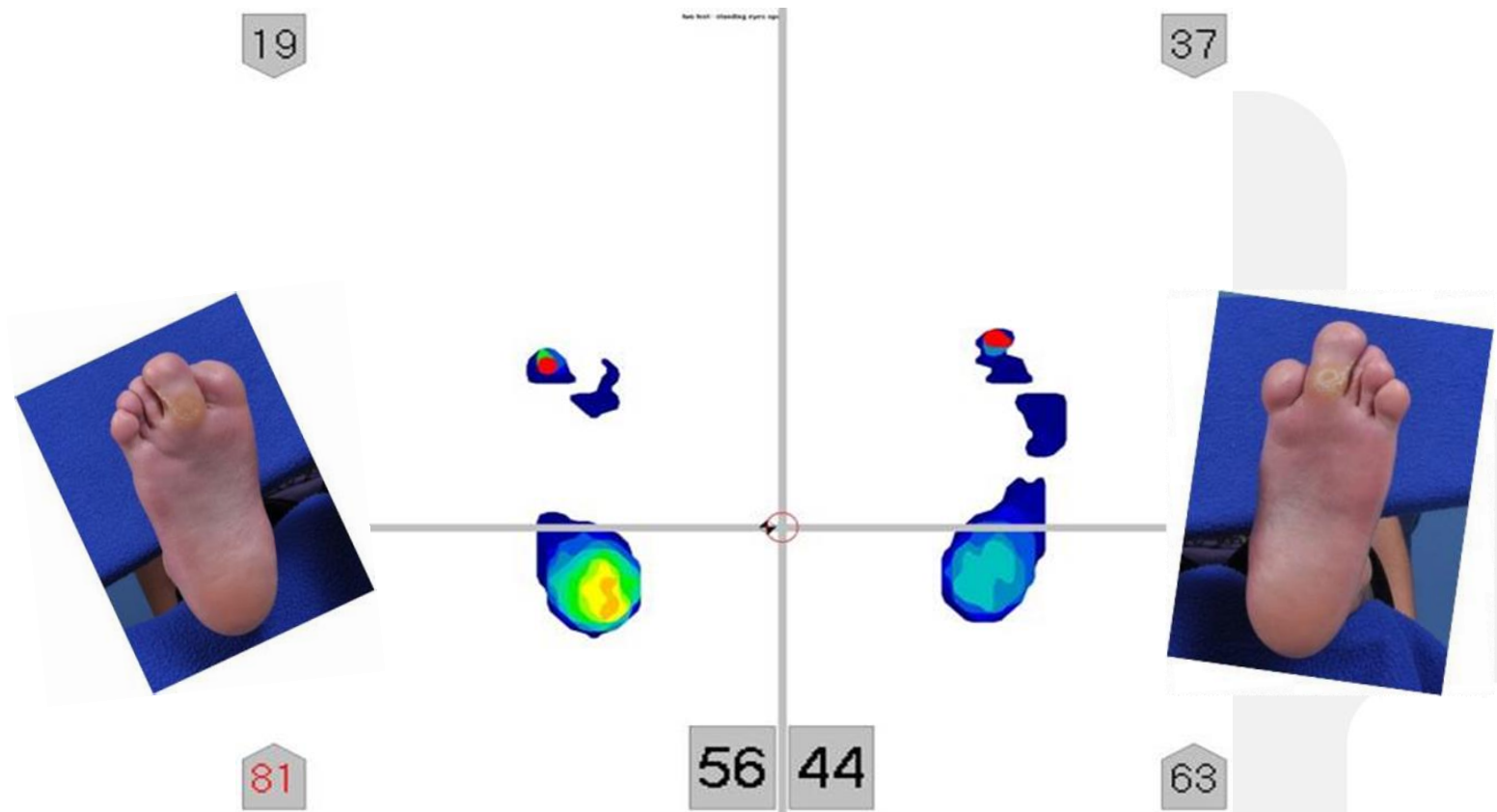


Fig. 3. Foot pressure scans of a 11-year-old female.

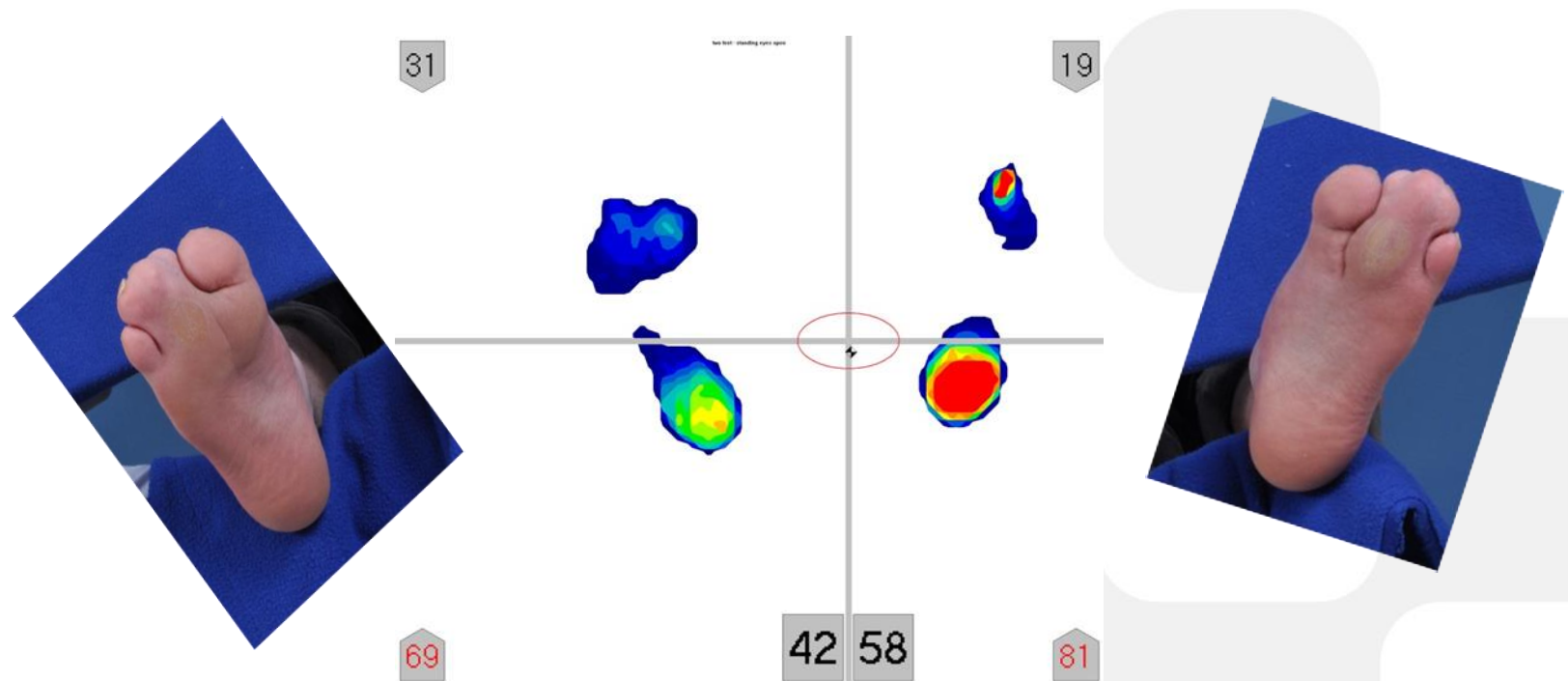


Fig. 4. Foot pressure scans of a 20-year-old male.

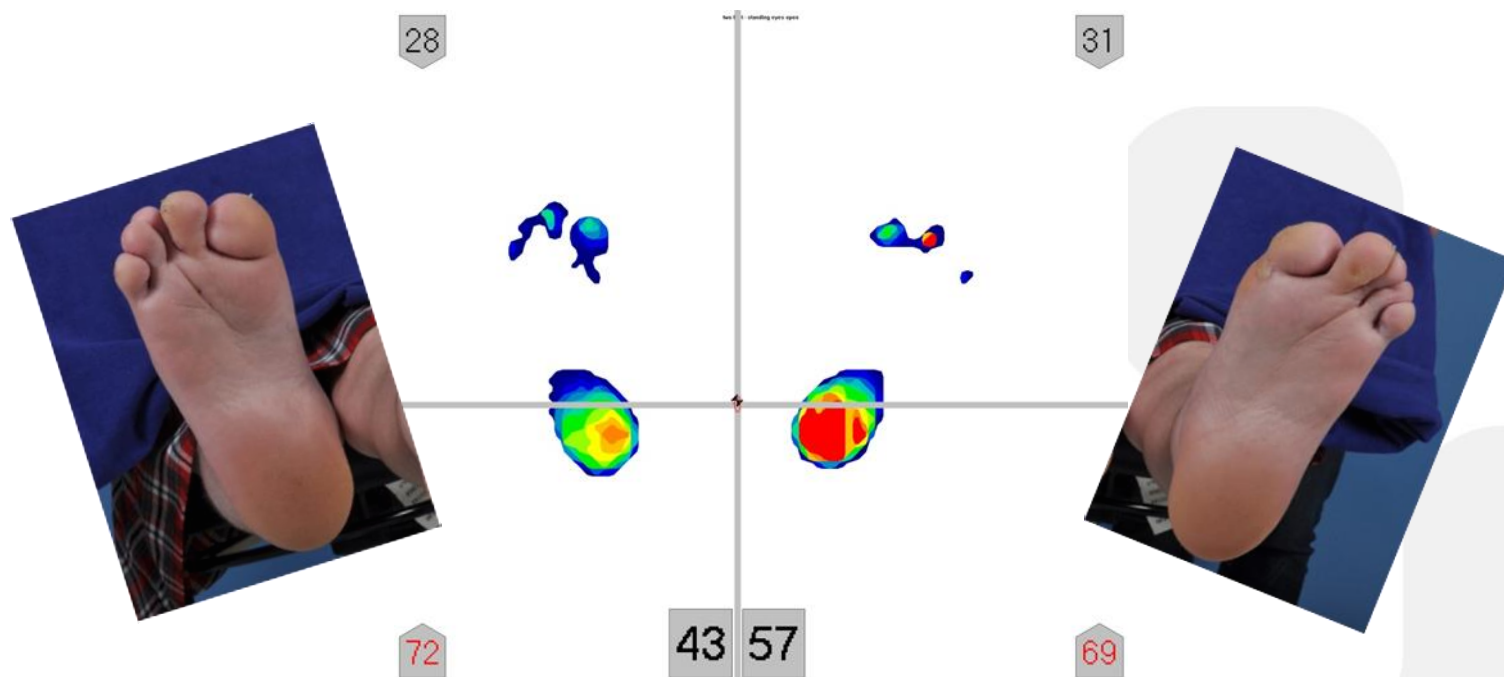


Fig. 5. Foot pressure scans of a 20-year-old female.

Conclusions

- This groundbreaking study shows that most patients present with asymmetrical pressure distribution between their feet, and a lack of support along the lateral arch and gait.
- The findings may be significant factors associated with falls.

Implications for Nursing Practice

- The findings indicate the importance for nurses working with this population to be aware that patients with Apert syndrome may be at high risk for falls.

Implications for Nursing Practice (Cont.)

- Efforts should be carried out to prevent falls, improve quality of care and promote a safe environment for patients with Apert syndrome.

Thank you for your attention!!

ANY QUESTIONS?

Kanlaya.Ditthakasem@hcahealthcare.com

(972) 566-3490

John.Kolar@hcahealthcare.com

(972) 566-6721