

Reference

İsmail Büyükceran¹, Hikmet Çinka², Alparslan Yurtbay³, Hüseyin Sina Coşkun¹, Alper Çiraklı⁴, Emrah Sayı⁵, Davut Keskin¹

Treatment results of patients with developmental dysplasia of the hip, who were treated with Tübingen hip flexion splint

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Products

Tübingen hip flexion splint (THFS)

Major Findings

With Tübingen hip flexion splint (THFS):

→ Overall high success rate for treatment of developmental dysplasia of the hip (DDH) with the THFS

- based on the number of hips: 94.7% success rate
- based on the number of patients: 92% success rate

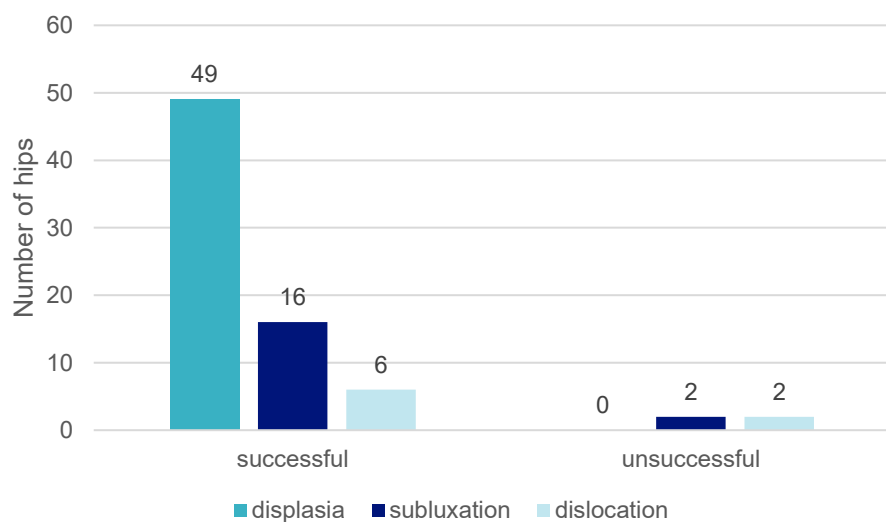


Figure: Success and failure rates of treatment with the THFS according to the type of DDH

→ Success rate of the treatment depends on initial Graf stage*:

- Two of the 4 unsuccessful patients had type 3 and two had type 4 irreducible hips according to the Graf classification

→ No femoral nerve palsy and avascular necrosis of femoral head were reported.

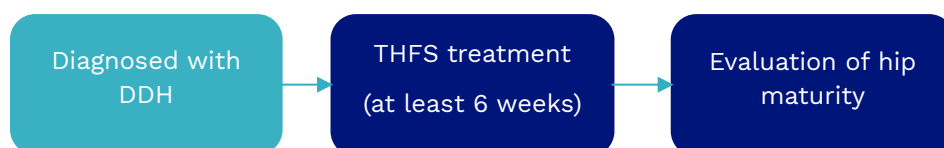
→ No skin problems were encountered.

*Graf classification: an ultrasound-based system to assess developmental dysplasia of the hip (DDH)

Type I	Type IIa	Type IIb	Type IIc	Type IId	Type III	Type IV
normal	immature	dysplastic	critical dysplastic	decentred	subluxated	fully dislocated

Population	Subjects:	50 patients (40 female, 10 males)
	Mean age:	3.48 months (range 1.5 - 5.5 months)
	Affected side:	75 hips (25 bilateral, 19 left, 6 right)
	Clinical condition:	Developmental dysplasia of the hip (DDH), according to Tönnis stage system: 49 dysplasia, 18 subluxation, 8 dislocations

Study Design Retrospective, observational, single center:



All patients were diagnosed clinically and by ultrasonography. The THFS treatment was initiated within 24 hours after diagnosis. During treatment, the splint was worn continuously (24 hours/day) for at least six weeks, followed by a reduced wearing time depending on improvement. Patients were followed regularly with clinical examinations, typically every 2–4 weeks. Treatment success was defined as cases with normal hips detected in ultrasonography; reduction of the femoral heads concentrically to the acetabulum on direct anterior-posterior pelvis radiography (stage 1 according to the Tönnis staging system), sufficient acetabular index value and patients without avascular necrosis. Patients who did not meet these criteria were considered unsuccessful.

Results

Functions and Activities						Participation	Environment
Biomechanics – Static Measurement	Biomechanics – Gait analysis	X-Rays	EMG	Functional tests	Clinical effects	Satisfaction	Health Economics

Category	Outcomes	Results for Tübingen hip flexion splint	Sig. ^a
Clinical effects – Success rate	Overall patients	46 out of 50 (92%)	n.a.
	Overall number of hips	71 out of 75 (94.7%)	n.a.
	According to the condition of the hip prior to the start of treatment.	Four treatment failures: 2 with type 3 and 2 with type 4 irreducible hips according to Graf ultrasound classification.	n.a.
Clinical effects	Mean duration of treatment	5.5 months (range 3–9 months)	n.a.
Clinical effects – Correlations	Between hip side and success	No significant correlation was found between hip side and success.	0
	Between onset age and success	“We think there is no significant relationship between the age of onset of treatment.”	n.a.

Category	Outcomes	Results for Tübingen hip flexion splint	Sig. ^a
– Side effects	Avascular necrosis	None reported.	n.a.
	Femoral nerve palsy	None reported.	n.a.
	Skin problems	None reported.	n.a.

^a no difference (0), positive trend (+), negative trend (–), significant (++)/–), not applicable (n.a.); significance set at $p < 0.05$; trends set at $0.1 > p > 0.05$

Author’s Conclusion “THFS allows free movement of the knees and ankles and it is easy to use, practical, family-friendly, and easy to clean thanks to its plastic structure. As a result of this study, the Tübingen hip flexion-abduction splint is an effective and successful method for treating developmental dysplasia of the hip.” (Büyükceran et al., 2023)

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