

Introduction

Background: Patellofemoral pain (PFP) is a common cause of anterior knee pain with a prevalence in the general population of 25-40%.^{1,2} PFP is an overuse condition that can lead to increased pain with activities like running, stair-climbing, or squatting.³ It is estimated that approximately 25% of recreational athletes with anterior knee pain discontinue participation in their sports.⁴ Knee brace designs including sleeves and straps have been utilized for PFP with mixed results.⁵ Current clinical practice guidelines do not recommend bracing for PFP because of lack of evidence to support its use.⁵ A new brace, named the NuNee, provides a distraction force to the patella while allowing full participation in functional activities.⁶

Purpose: To determine the effect of the NuNee brace on pain levels and function for participants with anterior knee pain over a 6 week period.

Hypothesis: After 6 weeks of using the NuNee brace, participants will have decreased pain levels and improved function.

Methods

Data were collected on 24 participants, ages 18-60, at baseline and 6 week follow up. Participants were screened for anterior knee pain by a primary researcher using a standardized musculoskeletal exam to rule out other causes of knee pain. Participants self-reported their knee pain via the Numerical Rating Scale (NRS), as well as completed the Kujala Anterior Knee Pain Questionnaire. Depending upon the provocation of symptoms, participants performed stair negotiation, squatting, or running both with and without the brace. Participants utilized the brace for 6 weeks during exercise and logged their usage of the device. At the 6 week follow up, NRS ratings with and without the brace, as well as an updated Kujala Score, were obtained. Descriptive statistics and repeated measures ANOVA were performed.

Results

Table 1: Demographics

	Age (years)	Gender	BMI	Years with pain
N=24	18-60	9 male	17.1-34.2	0.25-10
	Avg: 26.21	15 female	Avg: 24.41	Avg: 4.51
	SD: 12.84		SD: 4.10	SD: 3.37

Table 2 : NRS Pain Values During Functional Testing

	Mean	SD	Confidence Interval	P Value
Baseline - No Brace	3.54	2.01	(2.78, 4.30)	<.001
6 Weeks - No Brace	1.29	1.33	(.73, 1.85)	
6 Weeks - Brace	0	0	0	

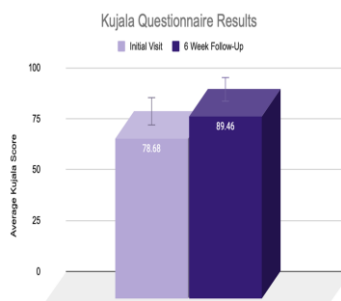


Figure 1: Kujala Results at Baseline and Follow Up

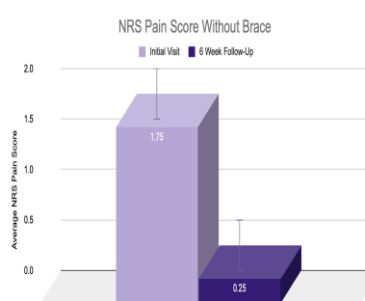


Figure 2: Mean NRS Values Baseline and Follow-up

Discussion

With use of the NuNee brace, participants demonstrated a significant improvement in Kujala scores after six weeks of brace use with activity ($p < .001$). NRS pain scores with functional activity were significantly lower at 6 week follow up compared to baseline ($p < .001$). Improvement was defined as at least 1 point on the NRS scale.⁷ Upon arrival to the 6 week follow up, 20 of the 24 participants reported 0/10 pain without the brace. During functional testing at 6 week follow up, 10 participants reported 0/10 pain without the brace, and all 24 reported 0/10 with the brace.

Clinical Importance

The NuNee brace may be beneficial to individuals who experience anterior knee pain during exercise. The brace can reduce pain, improve physical function during activity, and improve tolerance for patients during weight bearing activities by applying a distraction force to the patella on the femur.

Limitations

- Small sample size
- Variability in donning the brace between participants
- Reported difficulty when wearing the brace during various athletic activities, as well as loosening of the adhesive
- Lack of control group

References

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Table 1 - Demographics

	Age (years)	Gender	BMI	Years with pain
N=28	18-60 Avg: 26.21 SD: 12.84	11 males 17 females	17.1-34.2 Avg: 24.41 SD: 4.10	0.25-10 Avg: 4.51 SD: 3.37

Table 2 - Kujala Questionnaire Results: Baseline and 6 Week Follow-Up

	Mean	SD	Confidence Interval	P Value
Initial Visit	78.68	8.53	(75.41, 81.95)	<.001
6 Week Follow-Up	89.46	6.47	(86.77, 92.15)	

Table 3 - NRS Pain Values During Functional Testing at 6 Week Follow-Up

	Mean	SD	Confidence Interval	P Value
Without Brace	1.29	1.33	(.73, 1.85)	<.001
With Brace	0	0	0	

Table 4 - NRS Pain Values During Functional Testing

	Mean	SD	Confidence Interval	P Value
Baseline - No Brace	3.54	2.01	(2.78, 4.30)	<.001
6 Week Follow-Up - With Brace	0	0	0	
6 week Follow Up - Without Brace	1.29	1.33	(.73, 1.85)	

Table 5 - NRS Pain Values at baseline and 6 weeks without brace

	Mean	SD	Confidence Interval	P Value
NRS at intake	1.75	2.07	(.96 - 2.54)	<.002
NRS at 6 weeks	.25	.61	(-.01 - .51)	