

## Effect of Three Lateral Knee Braces on Speed and Agility in Experienced and Non-Experienced Wearers

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### **Abstract:**

The purpose of this study was to examine the effect of three lateral knee braces on speed and agility in subjects experienced as brace wearers and subjects with no prior experience as brace wearers. Nine subjects having prior experience and 10 subjects having no prior experience as brace wearers were tested for speed and agility under four treatment conditions including: 1) no brace, 2) McDavid Knee Guard, 3) Donjoy Defender, and 4) Anderson Knee Stabler. Subjects performed a 40 yard forward sprint and a 10 yard shuttle run during one test session, and a 20 yard backward sprint and a 40 yard square cone drill during a second test session. Analysis of Variance indicated that for experienced wearers, no differences were found between any of the treatment conditions during the 20 yard backward sprint, square cone drill, or shuttle run. During the 40 yard dash, the no brace times were faster than each of the braced times. For non-experienced wearers, significant differences were found between the no brace and braced times during the 40 yard dash, shuttle run, 20 yard backward sprint, and square cone drills. These findings suggested that for experienced wearers the effect of knee bracing is greatest on reducing only forward speed, while for non-experienced wearers both forward and backward running speed and agility is reduced. In general, little difference was found between the three braces during any of the performance tests.

### **Article:**

Research has previously examined the role of prophylactic lateral knee bracing on joint biomechanics (1,5) and incidence of injury in football (3,4). Also of concern has been the effect of lateral knee bracing on performance. Knee braces have been shown to decrease forward running speed but not backward running and agility (6) and to have no effect on muscular strength, power, and endurance (2).

No research has examined the role of familiarization with bracing on athletic performance. Furthermore, no scientific evidence exists to substantiate the clinical impression that familiarization with bracing would presumably minimize any deleterious effects on performance. Thus, the purpose of this investigation was to examine the effect of three lateral knee braces on speed and agility in subjects experienced as brace wearers and subjects with no prior experience as brace wearers.

## METHODOLOGY

Nineteen post-graduate military academy football players served as subjects (age = 19.3 yr, wt = 207 lb, ht = 73 in). Nine subjects had prior experience and were accustomed to wearing lateral braces and 10 subjects had no prior experience wearing a brace. All subjects were tested for speed and agility under four treatment conditions including no brace (NB), McDavid Knee Guard (MKG), Donjoy Defender (DJ) and Anderson Knee Stabler (OMNI). The braces were applied bilaterally with neoprene/velcro straps by a certified athletic trainer according to manufacturer guidelines.

Subjects were tested under four treatment conditions during two test sessions. Session I consisted of a 40 yard forward sprint and a 10 yard shuttle run. The shuttle run was designed to test lateral agility. Session II consisted of a 20 yard backward sprint and a 40 yard square cone drill. The square cone drill included a 10 yd forward sprint, 10 yd lateral shuffle, 10 yd backward sprint, and 10 yd carioca. Following a stretching period, subjects were given two practice trials per drill. Data collection consisted of one trial for each drill recorded as the mean of two hand held timings. The order of brace condition and performance test was randomized for each subject.

A one-way analysis of variance with repeated measures was computed for subjects experienced as brace wearers and for subjects having no prior experience as wearers for each of the speed and agility tests. Fisher LSD post hoc analysis was computed to determine how the two groups differed.

## RESULTS

The mean times for the two speed and two agility tests for each treatment condition for all subjects are presented in Table 1. For experienced wearers, no differences were found between any of the treatment conditions during the 20 yard backward sprint, square cone drill, or shuttle run. A significant difference was found during the 40 yard dash. ( $F(3,24) = 5.23, p < .01$ ). The NB times were faster than each of the three braced times ( $p < .05$ ).

For non-experienced wearers, a significant difference was found during the 40 yard dash ( $F(3,27) = 3.98, p < .05$ ), shuttle run ( $F(3,27) = 2.86, p < .05$ ), 20 yard backward sprint ( $F(3,27) = 5.49, p < .01$ ), and square cone drill ( $F(3,27) = 5.08, p < .01$ ). During the 40 yard dash, NB times were faster than both the MKG and DJ times ( $p < .05$ ). During the shuttle run, NB times were faster than MKG ( $p < .05$ ). The 20 yard backward sprint and square cone times were faster for NB than for each of the three brace conditions ( $p < .05$ ).

**Table 1. Average time (seconds) for performance tests (Mean ± SE)**

Condition	Performance Test							
	40 yd Dash		10 yd Shuttle Run		20 yd Backward Sprint		40 yd Square Run	
	Ex	NEx	Ex	NEx	Ex	NEx	Ex	NEx
NB	5.36 (.13)	5.11 (.07)	3.46 (.06)	3.29 (.09)	4.15 (.14)	3.75 (.11)	9.34 (.26)	8.76 (.21)
MKG	5.53 (.12)	5.27 (.07)	3.47 (.09)	3.48 (.08)	4.28 (.13)	3.93 (.10)	9.69 (.17)	9.12 (.24)
DJ	5.51 (.14)	5.22 (.07)	3.54 (.07)	3.37 (.09)	4.14 (.09)	3.86 (.10)	9.34 (.26)	9.11 (.30)
OMNI	5.51 (.13)	5.17 (.08)	3.52 (.07)	3.42 (.11)	4.23 (.15)	3.85 (.09)	9.59 (.21)	9.35 (.19)

NB (No Brace), MKG (McDavid Knee Guard), DJ (DonJoy Defender), OMNI (Anderson Knee Stabler), Ex (Experienced Wearer), NEx (Non-Experienced Wearer)

## DISCUSSION

The prevalence of prophylactic knee bracing in football has previously been documented (3,4,6). The purpose of this investigation was not to criticize the efficacy of such bracing, but rather to determine if any difference existed between those accustomed to wearing a brace and those without previous familiarity with bracing.

For both experienced and non-experienced wearers, 40 yd dash times were faster for the no brace (NB) condition than for all but one brace condition, which is consistent with data reported by Prentice and Toriscelli (6). All three brace conditions were slower for non-experienced wearers during the backward running test. Moreover, we found that backward running had no effect on experienced wearers, as also shown by Prentice and Toriscelli (6). The implication of these findings demonstrate that familiarization with brace wearing for players involved in backward running, for example linebackers and defensive backs, would seem beneficial. In addition, the non-experienced wearers displayed faster times for the NB condition than for all three brace conditions on the square cone drill. The square cone drill would also seem to replicate activities more commonly associated with defensive specialty players, and thus the need for familiarization.

This investigation demonstrated that essentially no differences exist between the three brace conditions for either the agility or speed tests for experienced wearers. This finding suggests the rationale for brace selection should be based on player or clinician preference rather than on the brace's potential effect on performance.

The implication of these findings with regard to clinical practice suggests that players given the opportunity to become familiar with lateral knee braces may experience a decrement in only forward sprinting performance. In contrast, first time wearers are likely to experience some reduction in both forward and backward running speed and agility. The magnitude of this effect on actual on-field performance remains unclear. However, these findings would seem to justify the use of brace wearing in practice and conditioning situations to enhance familiarization and reduce potential detrimental effects on performance.

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