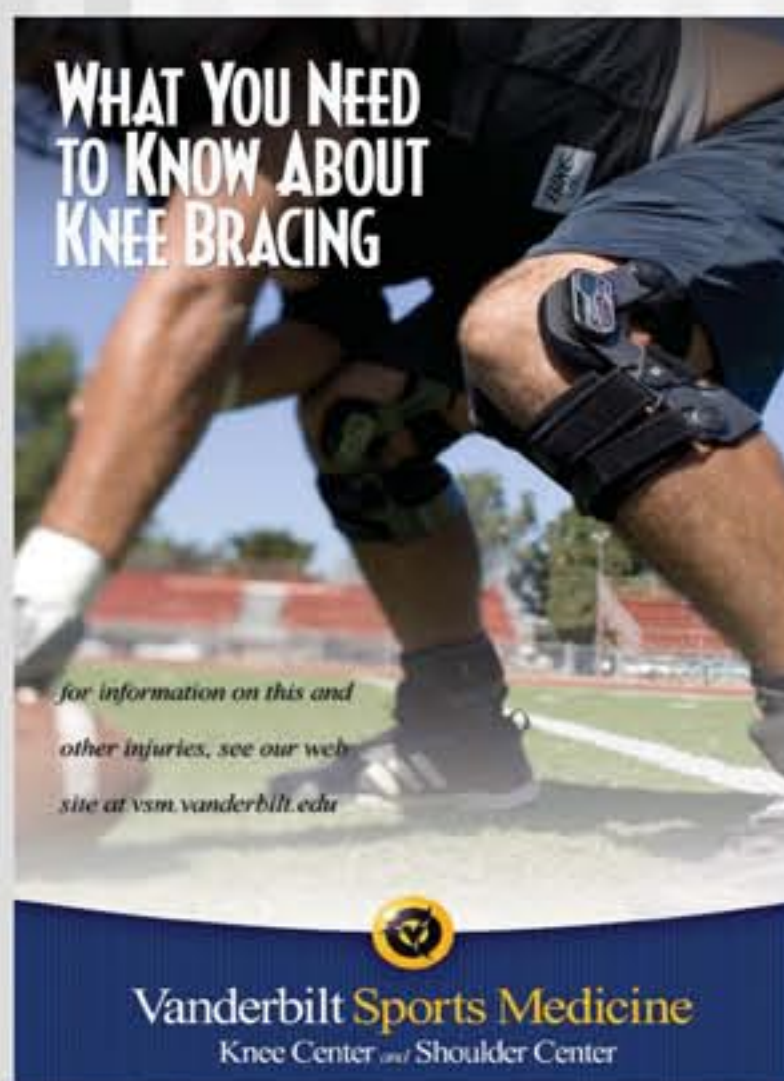


WHAT YOU NEED TO KNOW ABOUT KNEE BRACING

QUESTIONS:

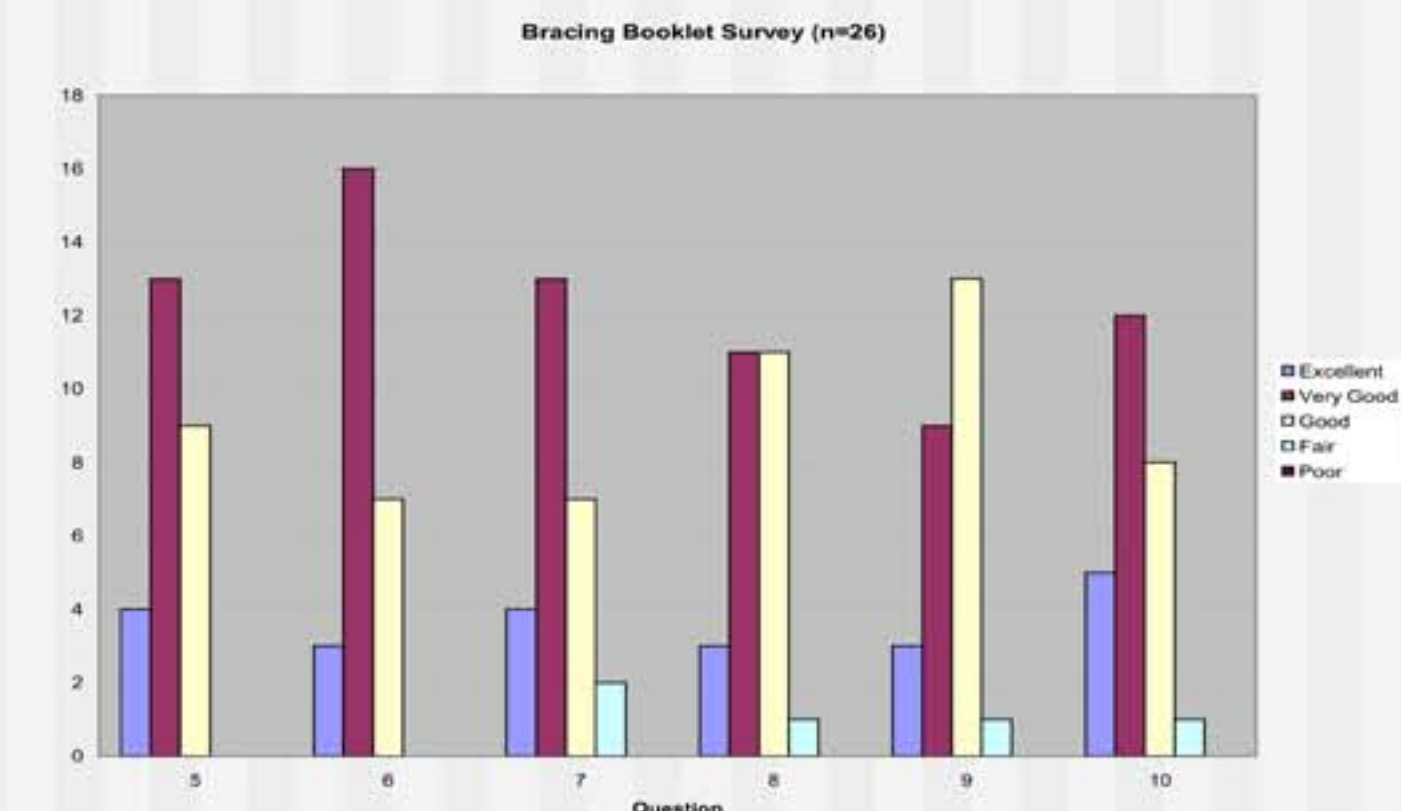
1. Is the knee bracing educational booklet proving useful from the patient's perspective?
2. Do rigid prophylactic knee braces prevent acute ligamentous injury to the knee?



PROCEDURES:

- A patient satisfaction survey was developed for distribution to analyze the effectiveness and utilization of the educational bracing booklets given to the patient.
- A systematic literature review was performed by typing 'knee braces' into various data bases. Over 780 articles were initially identified from which we limited our search criteria by: type of study, Level III evidence and above, prophylactic usage only, and no previous injury to the knee. Thirty-eight (38) studies were reviewed; all but eight (8) were eliminated based on the search criteria. Three (3) Level II studies and five (5) Level III studies were used in this review.

INTERCOLLEGIATE ATHLETIC TRAINERS FOCUS GROUP
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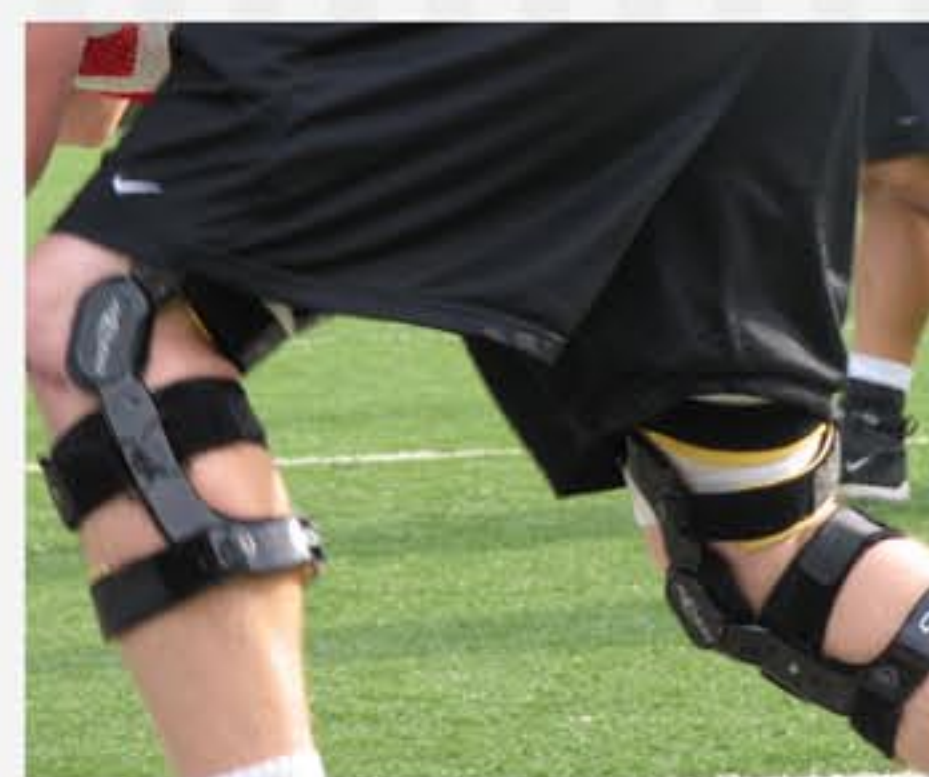
EBM LITERATURE REVIEW

Authors	Year	# of Subjects	Type of Study	Level of Evidence	Intervention	Outcome	Clinical Significant	Discussion Points
Felt C.C., Hermanson B.K., Kronmal R.A., Doherty P.H.	1987	6307	Retrospective Case Control	II	Braced with a variety of braces MCL ONLY: Don. Jay, Am. Ho. Study did not specifically describe each brace.	Overall ligaments injured: 20/2297 BR - 256/4010 NB, 11% BR injury compared to 6% NB MCL ONLY: 1984 BR INJ 175/2302 = 7.6% 1984 NB INJ 143/3408 = 3.5% 1985 BR INJ 130/2407 = 5.4% 1985 NB INJ 107/2972 = 3.6%	Overall - p<.05 YES MCL ONLY - p<.05 YES	Overall, BRACED players were significantly more susceptible to ligamentous injury versus control group. When separated by skill level, BRACED players have a significantly increased chance of ligamentous injury. Specifically, BRACED players have a significantly increased chance of MCL injury. Study showed that all positions, except linemen, were more susceptible to MCL injury than their non-braced control.
Drace T., Skipper S., Neaberry J., Nelson M., Corrales E., et al.	1988	580	Retrospective Cohort	II	1. Unilateral single hinge 2. Unilateral double hinge	SH BR INJ 23/247 = 9.3% NB BR INJ 4/93 = 4.8% NO BR INJ 7/250 = 2.8%	SH = p<.001 NB = p<.05	Overall, players were statistically more susceptible to ligamentous knee injury while wearing a SINGLE hinged lateral knee brace. There was no statistical significance between experimental vs control group with DOUBLE HINGE braces.
John P. Abright, John W. Powell, Walter Smith, Al Martindale, Edward Crowley, et al.	1985	987	Case Control	II	DR-Pre-shelf single or double upright brace providing protection from a lateral blow.	100 MCL sprains per 987 braced players.	Overall: No Strang: Nonplayer: Yes	Overall, braced players were statistically less susceptible to an MCL sprain, but not significant. Brace wear was also optional per sitting, session, and position.
John P. Abright, John W. Powell, Walter Smith, Al Martindale, Edward Crowley, et al.	1985	987	Case Control	II	DR-Pre-shelf single or double upright brace providing protection from a lateral blow.	Frq & Inj rate per 100 RR for all MCL injuries: AB BR = 54, rate .066, UBR = 25, rate .060, IDR = 1.14 NP BR = 24, rate .073, UBR = 7, rate .027, IDR = 2.71	Overall: No Strang: Nonplayer: Yes	Overall, braced players were statistically less susceptible to an MCL sprain, yet not significant. But when the injury is broken down into braced players and nonplayers it was statistically significant that braced nonplayers were more likely to injure their MCL.
Rovers G. Hautz, H. Yates, S.	1987		Prospective Case Control	II	Anderson Knee Stabilizer (Over) (double hinged, single sided brace)	NB Season: 6/1100 BR all injuries, 4.0/100 RR GR1 MCL (57%) BR Season: 7.5/100 BR all injuries, 4.8/100 RR GR1 MCL (50%)	Overall: No	Overall, IR of knee injuries were higher in BR vs NB seasons, however not proven to be statistical significant. Increase in ACL injuries during BR seasons, however not significant to NB. IR in NB vs BR were not significant by player position.

Authors	Year	# of Subjects	Type of Study	Level of Evidence	Intervention	Outcome	Clinical Significant	Discussion Points
Deppen R.L., Landsted M.J.	1984	524	Cohort	III	Drill, Biomechanics, Range-side (single-sided upright brace)	NB 19/484 exposures to contact, BR 21/841 exposures to contact NB 7 ACL, 10 MCL BR 2 ACL, 16 MCL	Overall: No	Overall, there was no statistical significant difference between the NB or BR (p>.05). No statistically significant difference between contact vs noncontact for the BR and NB. When an injury occurred, there was no greater risk of a severe injury for NB and BR groups.
Siler, Ryan, Hopkinson, Wheeler, Santostier, Kolb, Polley	1990	1396	Control Group 705 Braced 691	II	Braced with Donutry Orthopaedics Protector Knee Guard (double hinged, single upright brace)	Overall 12 BR inj/691 25 NB/705 DR = Def Erad (double hinged, single upright brace) Injury Mechanism Direct Lateral Knee Contact 8 BR inj/ 17 NB inj	Overall MCL: Yes BR vs NB: Yes Lateral Contact: Yes	Greater number of knee injuries in the control vs the non-braced. The injuries with defensive players wearing braces was decreased compared to defensive players not in the control non-braced group. The most common injury mechanism was direct lateral knee contact. Fewer MCL injuries were seen in braced athletes as compared to the control but it was not statistically significant. Other discussion: Only athletes with previous ACL tears were excluded from the study. All other previous injuries were left in. Unable to remove the meniscus injuries from the comparison of defense to offense. How did not give total number of athletes on offense and defense that were available to play.
Hewson, G. Mendris, R. Wang, J.	1998	410	Control Group 224 Braced 186 (1985)	III	Anderson Knee Stabilizer (single-sided, dual axis, double hinged, single-sided knee device)	# practices/games tot expos Nonbraced - 29293 Braced - 28197 MCL Total Injuries Nonbraced=47 ACL/MCL=4 ACL=11 Braced tot # injuries MCL=61 ACL=13 MCL/ACL=4 Total # days missed Nonbraced MCL=1128 MCL/ACL=275 ACL=796 Braced MCL=599 MCL/ACL=164 ACL=292	Overall: No	Overall, knee brace over eight years with injuries from players 226 nonbraced (1977-1981) and braced group of 224 (1981-1985).



Unilateral, double-hinge, upright brace that was used in the literature review



Double-sided, double-hinge knee brace that is currently used today

ASSESSMENT:

- There were twenty-six (26) responses to the Zoomerang® surveys distributed to patients for a 32.10% response rate. The data entails six months of survey results. The fair response questions were evaluated to determine if those particular areas of the knee booklet needed revised. The question, "How would you rate the information on how to properly wear your brace?" had the highest fair responses of 7%. All of the other questions that received fair responses were related to the overall rating of the educational booklets and the use of the booklets as a future reference.

- From the EBM literature review, the majority of the published research failed to prove the efficacy of prophylactic knee braces. However, it should be noted that all the research studied a unilateral, single or double hinge knee brace which is rarely used in athletics today. There has not been any published clinical research on the prophylactic, bilateral knee brace currently used today. Therefore it is difficult to provide a conclusive statement about the efficacy of prophylactic knee bracing in preventing acute ligamentous injury to the knee.

RECOMMENDATIONS:

- From the patient satisfaction survey results, an additional tip will be added to the *Knee Bracing Tip* section instructing the patient to consult the instructional booklet they received with their knee brace for further suggestions.
- From the EBM literature review results, there was no evidence that would require the need to revise any of the knee bracing booklet.
- The evidence based research is inconclusive; therefore, we will not change our clinical best practice measures of utilizing bilateral rigid prophylactic knee bracing with our Division I football players.



Vanderbilt Rehabilitation Services