



Penn State's
Center for Sports Surface Research

THE **SPORTSTURF**
SCOOP

Sports Turf Injury Research



Penn State's Center for Sports Surface Research



Injury Risk

Sports Illustrated, November 1, 1993

A Fight Over Turf

Three recent injuries on AstroTurf have underscored NFL players' calls for a return to grass | by PETER KING

CHANGES BEAR WITH RECEIVERS: Wendell Davis looked over his shoulder into the blue sky above Philadelphia's Veterans Stadium on Oct. 10 and saw the football spiraling toward him. Davis, in full gallop, had Eagle cornerback Mark McMillan right with him, and the pun was a bit underthrown. Davis figured he would have to stop, turn and outjump McMillan for the ball.

At the precise moment that Davis planted his feet to jump for the ball, his turf shoes dug into the AstroTurf and hefted solid, as though they were nailed to the carpet. Davis felt something snap simultaneously in both knees, and he flopped to the artificial turf as if he'd been shot. He began screaming in pain. He

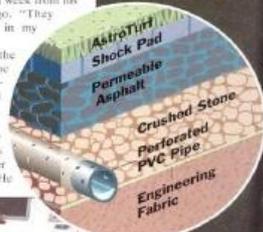
tried to move his legs but couldn't. When the trainers and team doctor reached him and straightened both legs, Davis looked down to see why it felt as if someone were stabbing him in both knees with knives.

"I saw the doctor trying to find my kneecaps," Davis said last week from his hospital bed in Chicago. "They found my kneecaps up in my thighs."

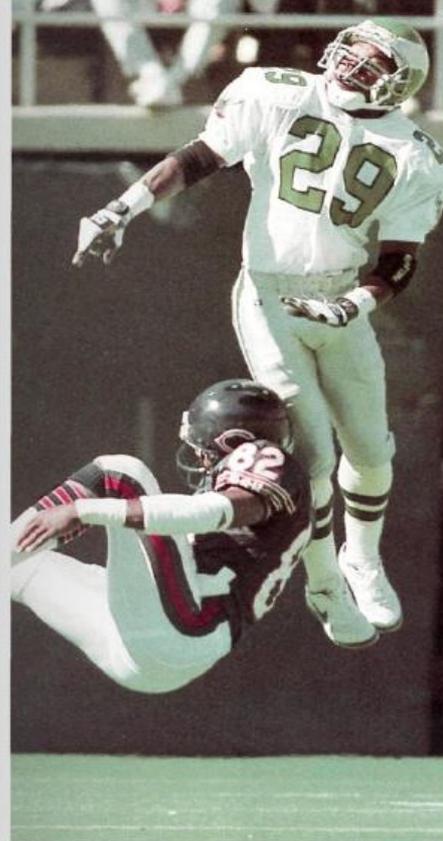
The patellar tendon is the rope of tissue that keeps the kneecap in place and stabilizes the joint. Davis had severed both of his patellar tendons. On Oct. 11 the knees were surgically repaired, and Davis's legs were encased in plaster casts from thigh to ankle. He

AstroTurf

The plastic surface rests on a foundation of potholing, asphalt and crushed stone that is designed for rapid drainage, but some players feel that it is too unforgiving.



Davis (82) came down hard after his patellar tendons tore, an injury that will leave him plenty of time for his daughter Sydney (left).



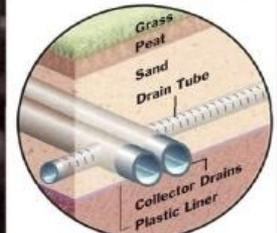
is confident that he will play football again, and his doctors are hoping for the best. For now, though, there is not much Davis can do but sit at home and read. His immediate choices: the Bible and *How to Handle Anxiety* by Charles Stanley.

On the same afternoon that Davis was injured, Indianapolis Colt defensive tackle Steve Emtman turned sharply to pursue Dallas's Emmitt Smith and crashed to the artificial turf of the Hoosier Dome. His anterior cruciate ligament, medial collateral ligament and posterior tendon all ripped violently. Emtman is gone for the remainder of this season and may not be ready when camp opens in '94.

One week after Davis and Emtman went down, New York Giant wideout Mike Sherrard caught a pass and after a

Prescription Athletic Turf

PAT's natural, resilient surface is popular with players, and its drainage design has earned high marks from stadium managers.



long run pulled up short on the artificial turf at Giants Stadium. He had partially dislocated his left hip and suffered a fracture of the hip socket. He, too, is gone for the season, and on Oct. 20 he was back in the hospital with a blood clot in his hip.

There are two factors linking the injuries of Davis, Emtman and Sherrard: None of the three had been touched by another player at the moment his injury occurred; and each injury was sustained on a field covered by artificial turf. Those circumstances have reignited the smoldering debate over the safety of artificial turf, which is currently used by 15 of the



Injury Research



Is there a difference in injury risk when playing on synthetic turf vs. natural grass ?



How is Injury Risk Measured

- **Mechanical Tests**
 - Traction testers
 - Gmax tests
- **Biomechanical Tests**
- **Epidemiological Tests**

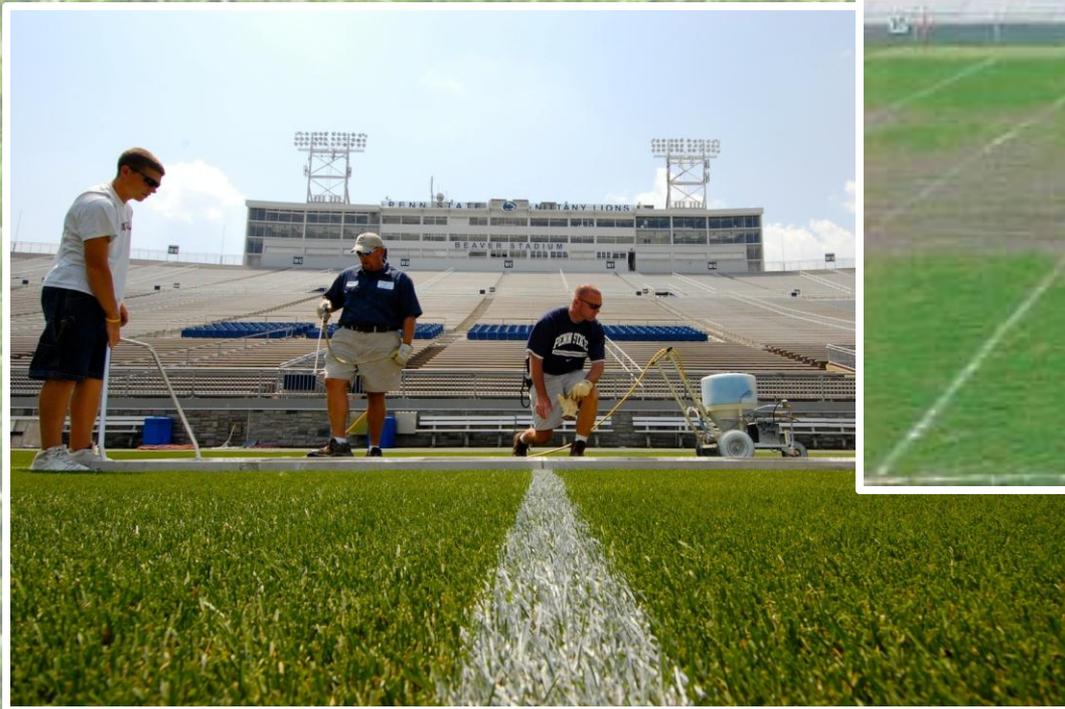


Epidemiological Studies

- **Very few of these studies – Why ?**
 - Shoe type ?
 - Contact vs. non-contact ?
 - Weather conditions
 - Who records the data ?
 - Aggravate previous injury ?
 - Statistics – need large sample size



Comparisons with Natural Grass



Injury Studies

- **12 scientific injury studies published – infilled synthetic turf vs. natural grass (peer-reviewed)**

- Soccer: 9 studies
 - Europe
 - Wide demographic

- **Football: 2 studies**
 - High school
 - College
- **1 rugby study**
- **So, are injuries for common on synthetic turf ?**



Research Results

- **No study found a higher overall injury rate on synthetic turf**
 - 1 football study – lower overall injury rate on synthetic turf



High School Football Study

Synthetic – higher incidence of...

- Zero-day time loss injuries
- Non-contact injuries
- Surface/epidermal injuries
- Injuries during high temperatures

Grass – higher incidence of...

- 22+ day injuries
 - Head and neural trauma
 - Ligament injuries
- *most injuries on dry fields



2010 NFL Injury and Safety Panel

- Higher number of knee and ankle injuries on synthetic turf
- Study has not been published in scientific journal

(as of summer 2011)



Scientific Findings

Published scientific papers:
No difference in overall injury rate



Surface Injury Research

- **Future studies –**
 - Injury patterns
 - Injury prevention (shoe selection, etc.)
- **Complete listing of studies on our website:**
<http://ssrc.psu.edu>



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