

## Less Pain, More Gain

**No pro sport has embraced technology** quite like football has. The NFL is always on the lookout for ways to make the game safer, more competitive, and more entertaining – superprotective space-age pads, wireless headsets implanted in helmets, ever-better instant replay and slo-mo. Here are some of the latest breakthroughs – from fields as diverse as medicine and materials science – along with a few goodies that are just a season or two away. – **Sam Jaffe**

### 1) JAW-SAVING HELMET

It might not look much different, but Ridell's Revolution, now worn by about 20 percent of NFL players (teams allow players to choose their own helmets), has been proven to reduce the risk of concussions by up to a third. High tech foam padding helps, but the real advance is much simpler: The extended sides protect the jaw from off-center hits – the most common cause of in-game head injuries.

### 2) ANTI-CONCUSSION

**MOUTH GUARD** Bad things happen when the jaw slams shut, causing vibrations from a hard hit to resonate throughout the skull. To combat this, Gerald Maher, the New England Patriots' team dentist since the late '70s, makes custom mouthpieces for dozens of players. The Maher Mouth Guard holds the jaw so that vibrations don't transmit from the lower mandible to the skull. He says a player has never gotten a concussion from a side hit while wearing his device.

### 3) SHOULDER PAD AC

Subzero winter temperatures are famous for testing a team's resolve, but summer heat causes most player deaths. A unique shoulder pad assembly designed by University of Florida researchers has airflow channels that can be connected to a tank of cold, compressed air on the sidelines. The product's maker, Williams Sports Group, claims the pads can keep a player's core temperature stable even in the most sweltering heat. Both college teams (Clemson Tigers) and pro squads (Indianapolis Colts) are using them to keep their cool.

### 4) THERMOMETER-IN-A-PILL

Players are often unaware that they're overheating. So a company called HQ designed a thermometer in pill form, which gets swallowed by players prior to the game and transmits core body temperature to trainers on the sidelines. Several pro teams, like the Philadelphia Eagles and Jacksonville Jaguars, have used the tiny device, which is also becoming popular with collegiate squads.

### 5) ADVANCED KNEE REPAIR

Arthroscopic surgery revolutionized sports by allowing athletes to return to the playing field after suffering what previously would have been catastrophic knee injuries. The next big thing is using bone-marrow stem cells to regrow the joint's meniscus (similar to cartilage). The technique is already used on racehorses, and the first human trials are now under way.

### 6) SOFT SURFACE

Many indoor stadiums have ditched AstroTurf in favor of FieldTurf. This long-bladed plastic grass, first used for indoor soccer in the mid-'90s, features a layer of rubber shavings to give the turf extra springiness. A recent study of high school football games showed less than half as many injuries during games played on FieldTurf as those played on natural grass. Even some of the NFL's open-air stadiums are switching to FieldTurf.

