



BY KENNETH G. SWAN, JR., MD

The Evolution of Casting

Throughout the past 50 years, we have seen a transformation in casting and fracture care. In the 1970s, the use of plaster of Paris casting material with cotton dressing underlayment was normal for fracture care. The application of plaster casts was messy and time-consuming. The casts tended to be heavy, to break and were very susceptible to water damage. In the 1980s use of fiberglass casting material began to replace plaster as the material that was used to make a cast. Fiberglass tended to be a little stronger, a bit lighter, and less messy to apply vs plaster. However, the early fiberglass casts utilized a heat lamp to help “cure” the fiberglass. Fiberglass casting material was originally only white, but over time, manufacturers came out with a selection of colors, which was often appealing to younger patients. Patients were still instructed not to get the fiberglass casts wet, but this was not necessarily because it would cause a breakdown of the material, rather it was the concerns with the under-casting material, and the propensity for skin breakdown that could occur with moisture. Both casting methods contributed to a good bit of odor that caused concern among many patients.



Plaster cast

In the 1990s, Gore-Tex®, made from polytetrafluoroethylene (PTFE), which is a material used in the construction of waterproof material frequently used in many breathable jackets and rain gear was utilized as an under-casting material. Gore-



Fiberglass cast

Tex® provided the same fracture stability vs cotton-based material, but it offered the patient the luxury to shower and swim in pools with their casts. This new material was particularly beneficial for athletes who often played while wearing casts which created perspiration, and moisture under the casting material. Skin breakdown was still a concern as often patients did not take the necessary time to allow the underlayment material time to drain and dry. An additional downside to the use of Gore-Tex® was the higher cost vs cotton-based underlayment.

There were several studies done with pediatric patients looking at unplanned cast changes and it was found that 50% of those visits were because of wetness within the cast. The cost to replace a cast several times, and considering the office visit and physician time to apply each cast, illustrated how the Gore-Tex material saved costs because it reduced the unplanned visits for casting changes.

The downside to Gore-Tex® beyond the cost was that it could create some minor skin irritations in 11% of patients because of a moist or dirty under-cast environment. In general, the use of the Gore-Tex® material with good patient instructions to periodically rinse the cast did decrease unnecessary visits and excess re-casting.



3D printed splints

In 2021, we experience a new change to casting/splinting and that is with the use of 3D printed splints. The splint is waterproof, light, sturdy, and honey-combed in design which allows for maximal strength similar to a fiberglass cast while allowing for airflow. It is customized utilizing a simple scan of the injured site with an iPhone app, and measurement of 3 points for verification on sizing. The measurements and scan are sent to the manufacturing company, ActivArmor, and in 3-5 days, a customized splint is sent back to UOA for use with our patients. The splint is currently being used for a stable forearm, hand, finger, lower leg, and ankle applications. The splint is strong and durable which allows many patients to remain active, and to play sports while wearing the splint. The honeycomb design allows for airflow and water drainage which allows patients to swim, shower, or rinse off in the sink if the splint gets dirty. The splint is also removable which allows patients to initiate early motion, directly apply ice, or directly clean the extremity. Patients are no longer bothered with the odor or tormented by an itch you can't scratch that is frequently associated with a closed fiberglass cast. ActivArmor splints come in eleven different colors and the cost of the customized 3D splint is covered by most insurance carriers.

If you happen to suffer a fracture, talk to your physician to see if you are a candidate for a 3D customized splint for your fracture care.



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UOA is the sole provider of ActivArmor 3D
printed splints in the state of New Jersey