

The Casting Speed Study – a Comparison of Three Different Splinting Materials

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Abstract

Background: UCAST is an innovative splint designed to make casting easier and faster. The aim of this study was to compare the time taken to apply three different dorsal splints.

Methods: Four cast technicians with varying clinical experience made three splints, one of each type. We measured the time from beginning of preparations until the splint was finalized.

Results: The average splinting times were 5 min 48 s for UCAST, 8 min 56 s for fiberglass, and 9 min 56 s for plaster of Paris.

Conclusion: The UCAST splint was up to 42% faster to apply compared with traditional ways of splinting. After gaining some experience with UCAST, the time savings is probably even larger.

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Introduction

Distal radius fractures are among the most common fractures and are often treated with a dorsal splint. ‘UCAST wrist’ is an innovative splint manufactured by Dassiet Inc (Espoo, Finland). The UCAST splint can be used as a dorsal or volar splint and can be used for both hands. UCAST consists of a precut biodegradable Woodcast® plate and a one-piece textile padding including prefabricated fastening straps and extra padding at important locations. The Woodcast® material is completely nontoxic and has been tested in both the laboratory environment and in clinical studies [1–4]. With UCAST, no tools or other materials are needed to apply a complete splint, making the application process easier and less time-consuming than with traditional materials such as fiberglass and plaster of Paris (PoP).

This study was undertaken to compare the time taken to apply UCAST, PoP, and fiberglass dorsal splints.

Materials and methods

Four cast technicians (CT) in different stages of their careers were recruited for the study. CTs with different amounts of experience were chosen to better represent clinical practice. The CTs received a minor compensation for participating in the study but are



Figure 1. UCAST Wrist splint

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otherwise independent from Dassiet Inc. Background data for the CTs was collected at the beginning of the study through a paper form. All cast technicians had prior experience working with PoP, fiberglass, and Woodcast. Since UCAST was not on market yet, none of the CTs had used the UCAST wrist splint before. To ensure a fairer comparison, a brief demo on how to apply the UCAST was given before the study began.

Three materials were compared: Dynacast Prelude (fiberglass), Cellona Xtra (PoP), and UCAST wrist (Woodcast).

The CTs were divided into pairs. Each CT applied a total of three dorsal splints – one of each material – to the other CT, who rated the final splint for comfort and quality on a numeric rating scale (1–5, higher better). The CTs were instructed to apply the splints just as they would do in their daily practice to simulate normal patient care. The time taken from beginning of preparation until the CT announced that the splint was finalized was measured. The time taken to heat the UCAST splint to 65 degrees (to make it soft) was included. The time taken to fill a bucket with hand-warm water (for PoP and fiberglass), however, was not measured. Cleaning time was also not measured, since the cleaning practices likely vary between hospitals.

To approximate how long it takes for an experienced UCAST user to apply the splint, and to investigate the potential presence of a learning curve, a CT involved in the development of UCAST applied one UCAST splint to the first author, and the time was measured. All results are reported as mean (range).

Results

The four independent CTs had an average casting experience of 17 years (range 4–38 years). Their average experience with the Woodcast material was 6,5 years (range 3–10 years). Three CTs had completed a “Master of Casting” -degree. None had used the UCAST splint previously.

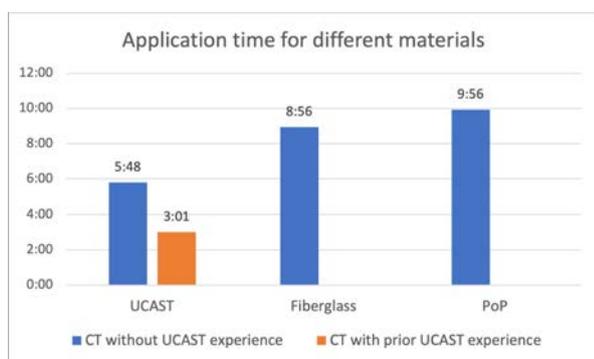


Figure 2. Average application time. CT, cast technician; PoP, plaster of Paris

Table 1. Average application time.

Splint material	Application time	Quality rating
UCAST	5 : 48 (5 : 08 – 6 : 55)	4.5 (4 – 5)
Fiberglass	8 : 56 (8 : 24 – 11 : 01)	3.25 (3 – 4)
PoP	9 : 56 (8 : 11 – 13 : 18)	3.75 (3 – 4)

The average application times for the four independent cast technicians are shown in Table 1. In Figure 2, the casting time for the CT with prior UCAST experience is also shown. The quality ratings for each material are also shown in Table 1. Compared to PoP, the time savings were 10% when using fiberglass and 42% when using UCAST. Compared with fiberglass, UCAST required 32% less time to apply.

The CT that had been involved in UCAST development applied a UCAST splint in 3 minutes and 1 second.

Discussion

This study showed that UCAST Wrist splint was significantly faster to apply than a traditional dorsal splint made of PoP or fiberglass. The faster application did not result in worse technical quality or patient comfort. On the contrary, the UCAST splint received the highest quality ratings (4.5 compared to 3.25 and 3.75 for fiberglass and PoP, respectively).

To provide a fairer comparison between the three materials, about 20 seconds should be added to the PoP and fiberglass application times, as the time taken to fill a bucket with warm water required for the splinting wasn't measured in the study. Furthermore, the cleaning time was not accounted for in this study. The UCAST leaves nothing to clean except the product pouch that needs to be discarded. Fiberglass and Pop, on the other hand, is messy to work with and often require extensive cleaning after splint application.

Since the CTs had applied the UCAST only once before (in the brief demo that preceded the study) and had made hundreds or thousands of casts with PoP and fiberglass before, it is likely that with more UCAST experience, the application time will reduce significantly. There seems to be a substantial learning curve even for a such simple device as UCAST, as the CT with prior UCAST experience was almost twice as fast as the CTs without prior experience. Learning to apply the two-piece UCAST splint efficiently ought to require much less training, though, than learning to handcraft a traditional splint, where one must master dealing with stockinettes, padding, bandage, cutting and molding the plaster or fiberglass, avoiding wrinkles etc.

Taking the above points into account it is likely that the difference in application time between UCAST and the two other materials will be further increased if measured in daily clinical practice.

Conclusions

The UCAST wrist splint was nearly twice as fast to apply and yielded better technical quality and patient comfort compared to traditional fiberglass and PoP splints. In clinical practice, the UCAST is likely to provide casting time savings of more than 50%. The time savings can have a large impact especially in large and busy hospitals.

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