Face Masks: The Negative Impression Makes a Positive Impact

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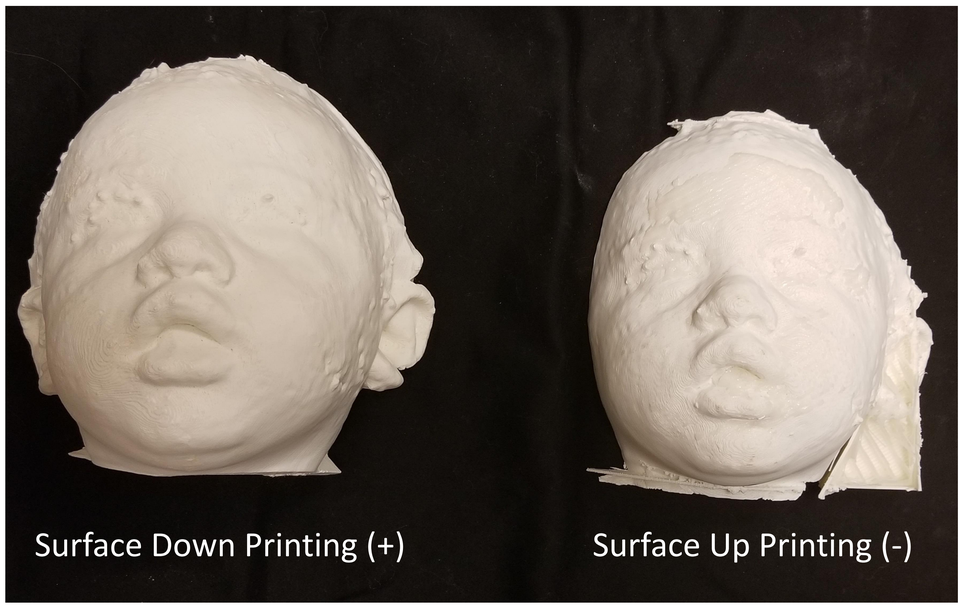
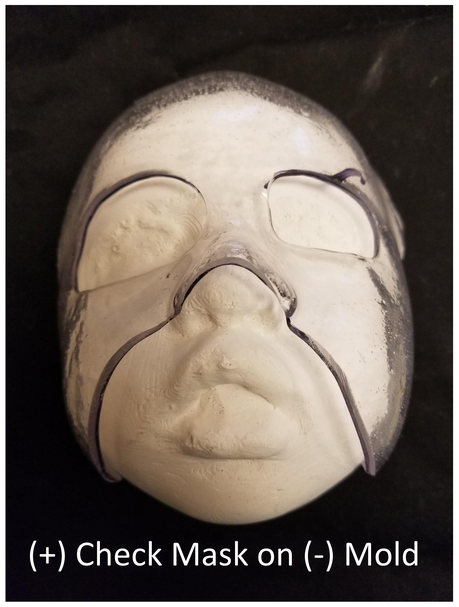
Background: Providing timely and appropriate pressure to prevent/address hypertrophic scarring for burn survivors is an ongoing challenge. From time of measurement to obtaining a custom compression garment can be several weeks. This necessitates using less effective, interim solutions to provide pressure, which can be particularly challenging in the pediatric population and for facial burn scars. Historically, to provide pressure for facial scars, custom fabric garments had to be ordered. Later, with the advancement of silicone-lined materials, clear facial masks could be fabricated. This process started with taking a plaster cast of the survivor's face, frequently using sedation to allow for optimal fitting. However, sedation can change the tone of the facial muscles. With recent advancements in technology, less invasive, more accurate and more timely fabrication of face masks is possible.

Methods: A 3D picture was taken of a pediatric burn survivor with hypertrophic scarring on the face. This 3D picture was uploaded to a 3D printer and a positive print (facial surface down) was completed. The positive print was used to make an alginate mask and plaster was poured into this mask to create a casting of the positive printed face. A check mask was pulled from this positive plaster cast (+ mask). However, this check mask was too large for the patient's face. To have a better fitting mask, another approach to the mask fabrication was completed. From the same 3D picture, a negative print (facial surface up) was completed. The plaster was poured *directly* into this negative print to create a casting of the negative printed face. A check mask was pulled from this negative plaster case (- mask). Both check masks were fit to the patient to assess for accuracy of fit and estimation of required adjustments for optimal fit.

Results: There was a significant difference in the fit of the two masks created from the same 3D picture. The mask pulled on the positive casting was too large. The required adjustments to have the mask fit properly to provide appropriate compression to the hypertrophic scarring on the face would have been extremely difficult and time-consuming to complete. The mask pulled on the negative casting fit well and only required minimal adjustments to ensure adequate pressure would be provided to the focused areas of hypertrophic scars on the face.





Conclusion: With advances in technology, 3D photography partnered with 3D printing can allow for significant improvement in the accuracy of fitting facial masks, improve timeliness of compression and improve the patient experience in the process of obtaining a facial mask.

Applicability of Research to Practice: The availability of technology can allow burn survivors to receive compression for facial scars in a faster, more accurate and patient-friendly manner, allowing for earlier intervention to prevent and/or improve facial hypertrophic scarring.