Title:
The Advantages of Additive Manufacturing to Reduce Cost of Design and Development in the Medical Industry: Paxman Case Study

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What is Paxman and scalp Cooling?

PAXMAN
PIONEERS IN SCALP COOLING

University of HUDDERSFIELD
Paxmans previous design and new design
Paxman’s main aims

Improved fit

Improved Comfort

Improved Scalp Contact
Medical design process vs the standard design process

Feasibility
  ↓
  Plan
  ↓
  Inputs
  ↓
  Outputs
  ↓
  Validations
  ↓
  Verifications
  ↓
  Changes
  ↓
  Review

→

DESIGN

EVALUATE

PROTOTYPE
3D scanning and ergonomic data?

Using data various 3D Database, research and also using 3D scanners from the University accurate standard size head model created.
Cap design and development

Using the head map, the design of our cap idea was generated and several ideas were tested to get maximum scalp contact.
Why did we use SLS?

- Good Material Options
- Good Heat Resistance
- Large Scale Printing
- Good Accuracy
Who did we use?

- 3M Buckley Innovation Centre
- Building Success Layer by Layer
- e-Manufacturing Solutions
- i.materialise: more than online 3D printing services
- Materialise: innovators you can count on
Time and Cost

<table>
<thead>
<tr>
<th></th>
<th>Time</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Subtractive manufacturing</td>
<td>4 – 8 Months</td>
<td>£15000 – £25000</td>
</tr>
<tr>
<td>Additive manufacturing</td>
<td>5 – 10 days</td>
<td>£750 – £1500</td>
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**Saved costs** - In total 8 sets of caps were printed, in all costing around £14,000. Traditional manufacturing we were estimated £150,000.

**Saved Time** – all 8 sets took a week to be completed so 8 weeks in total, traditional manufacturing would have taken approximately 48 months to complete saving us a total of 46 months.
Challenges with 3D printing

The main challenges with 3D printing we found were **Tolerances** and **Repeatability**

Male Tool  
Female Tool
Conclusion

Additive Manufacturing is a benefit to SMEs that may not have the funding for traditional manufacturing.

Product quality can be improved and time to market can be shortened using additive manufacturing in the design and development process.

A link is needed between product design and 3D printers to achieve the best results, reducing tolerance errors and printing in the most reliable way.
Thank you for listening

Any Questions?