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Orthopedic immobilization materials: Evolution through the ages

Chathushika Ekanayake

Mphil (Reading), University of Moratuwa, Sri Lanka

Statement of the Problem: Orthopedic immobilization have evolved since 3000 BCE, with plaster of paris being the benchmark material. The drive for superior casting material for superior casting and splinting properties including mechanical performance, light weight, excellent patient comfort, eco-friendliness and low cost is an ongoing process. A comprehensive review is important to understand the advantages and drawbacks of each material. Today synthetic materials with superior properties are widely used, but plaster is still a material of choice specially in long term immobilization and cost sensitive cases. Further, immobilization (rigid) is associated with complications both technique driven and material nature driven. These range from superficial pressure sores to high-risk compartment syndrome.

Methodology & Theoretical Orientation: The researchers applied a six-step method to identify existing immobilization material, immobilization complications and carry out a systematic literature review adhering to the PRISMA framework. Here, 948 records were identified from databases with 108 presented in the final data analysis. The AI assisted tool; Research Rabbit was used to carry out a highly refined search based on the selection criteria. **Findings:** Patients show a higher preference in using synthetic casts for short term and body extremity casting. Newer materials such as Woodcast shows good promise but their mechanical characteristics and comfort are yet to be critically analyzed. However, traditional plaster is used in long term immobilization due to high body conformity, low cost and availability. **Conclusion & Significance:** However, there is an imminent requirement to improve existing material and to introduce novel promising, yet sustainable material for long term immobilization which are carbon sensitive, to sit well with Net-Zero Carbon by 2050 goals.

Biography

Chathushika Ekanayake has expertise in materials especially sustainable materials employable in casting and immobilization and upcycling agricultural by products to suite net zero carbon goals. Industrial hemp in construction is her current research area of interest to work towards net zero carbon goals. She has completed her Bachelors in Biomedical Engineering providing the edge in developing orthopedic and medical material to provide better patient comfort. She is currently completing her Masters in Philosophy at the University of Moratuwa where her research is based on improving the existing plaster cast using sustainable fillers for better patient comfort. She is dedicated in bringing net zero carbon goals to the forefront through research (specially construction material) to aid battle global warming.

ekanayakeemjc.21@uom.lk

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