

# 49<sup>TH</sup> ANNUAL NURSING RESEARCH AND EVIDENCE BASED PRACTICE CONFERENCE

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## Does fracture patients need customized 3D printed casts

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**Introduction & Aim:** For patients with fractures, plaster casts with calcium sulfate composition or resin plaster with vinyl polymers and glass fiber composition are commonly used traditionally. Patients often complain a lot of inconvenience in limb fixation and care. Therefore, the aim of this study is to survey satisfaction of fracture patients using traditional plaster casts and then develop customized 3D printed casts.

**Method:** The descriptive-comparative research design was conducted. 36 forearm fracture patients of a regional hospital in central Taiwan were interviewed by a research assistant and measured by a bio-feedback device with a force sensor. The splint use satisfaction questionnaire scores and internal pressure of the injured arm covered with traditional plaster casts were collected after casting plasters for 15-20 minutes and before the removal of the plaster. Afterwards, our research team developed customized 3D printed casts according to the above-mentioned analyzed results.

**Findings:** The internal pressure of the injured arm covered with traditional plaster casts was not significantly different between after casting plasters for 15-20 minutes and before the removal of the plaster. After casting plasters for 15-20 minutes and before the removal of the plaster, the most unsatisfactory items were easy degree of skin cleaning, convenience of wound care on the limbs covered with casts, comfort of gypsum use, convenience of set-up and removal of the plaster casts and the permeability of the casts. Later, the customized 3D casts were printed to improve the convenience, permeability, materials, appearance, pressure level and easy degree of plaster use and preliminarily applied in six subjects.

**Conclusion:** The customized 3D printed casts that overcome the inconvenience of traditional plasters may be applied in clinical practice to improve care quality of fracture patient.

## Biography

Hua-Shan Wu is the Chair and an Associate Professor in the Department of Nursing, Asia University in Taiwan. Her research interests include two aspects for clinical practice and nursing education. In the field of clinical practice, exploring clinical concern phenomenon (e.g. dyspnea, eating difficulty, quality of life and care satisfaction) and analyzing the effects of implementing evidence-based interventions (e.g. acupuncture, massage, respiratory training, memory training, spaced retrieval, errorless learning and Montessori training) in adults with medical problems or the elderly with chronic dyspnea, cognitive impairment, disability and dementia.

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