

ARTICLE

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The use of silk-based devices for fracture fixation

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Metallic fixation systems are currently the gold standard for fracture fixation but have problems including stress shielding, palpability and temperature sensitivity. Recently, resorbable systems have gained interest because they avoid removal and may improve bone remodelling due to the lack of stress shielding. However, their use is limited to paediatric craniofacial procedures mainly due to the laborious implantation requirements. Here we prepare and characterize a new family of resorbable screws prepared from silk fibroin for craniofacial fracture repair. *In vivo* assessment in rat femurs shows the screws to be self-tapping, remain fixed in the bone for 4 and 8 weeks, exhibit biocompatibility and promote bone remodelling. The silk-based devices compare favourably with current poly-lactic-co-glycolic acid fixation systems, however, silk-based devices offer numerous advantages including ease of implantation, conformal fit to the repair site, sterilization by autoclaving and minimal inflammatory response.

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