Experimental use of adhesives in the repair of transverse fractures of the rat and rabbit.

Authors: Papatheofanis F.J., Ray R.D.

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Abstract:

In this preliminary study, the feasibility of fixing fractured bones was explored using the ethyl and isobutyl 2-cyano-acrylates, prepolymerized barnacle cement, and fibrin glue. Adequate cohesive strength cannot be obtained when lipids are present on the surface to be joined by alkyl 2-cyanoacrylates. Oxidized regenerated cellulose gauze soaked in a highly concentrated fibrinogen solution was inserted into the partially hollowed fracture ends to arrest the flow of oozing blood from the medullary canal. Anhydrous ether was used to sponge off any residual lipid from the bone surfaces. The displaced fracture ends were aligned and narrow strips of bone were secured around the fracture line resulting in a barrel stave arrangement. Roentgenograms indicated successful reduction of transverse (midshaft) fractures in eight rat (femur) and seven rabbit (tibia) models. In some cases, casts were used as supplementary fixation. Using the ethyl and isobutyl 2-cyanoacrylates, reduced fractures were maintained in a stable position for up to five and six days, respectively. Further study of the 2-cyanoacrylates is recommended. By using a standardized surgical method for testing the usefulness of future adhesives in vivo, consistent interpretation of results will be facilitated.