

# THE PHYSICAL PROPERTIES OF SUTURE MATERIALS AS RELATED TO KNOT HOLDING

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## SUMMARY

The physical properties of suture materials have been investigated in relation to knot holding.

Monofilament sutures were found to be stronger than braided sutures. Metallic sutures are the strongest, synthetics intermediate and natural fibres the weakest.

There is a great variation in the diameter of standard sizes of sutures which may account for some controversy with regard to strength.

The "nylons" are the most extensible followed closely by steel. The "dacrons" and "silks" are far less extensible.

Steel has the greatest knot holding ability and nylons the least. Dacrons and silk have good knot holding qualities, which are, however, markedly reduced by treatment with wax, silicone or teflon.

## Introduction

The physical properties of suture materials have been investigated by many workers (Conn, 1974; Craig, 1975; Flinn, 1959; Herman, 1970, 1971; Holmlund, 1974; Madsen, 1953; Magilligan, 1974; Malstrom, 1975; Taylor, 1938).

Previous data on the knot holding properties of suture material have not been quantitative. We have devised a simple method of testing knot holding and have studied the physical properties of the commonly used suture materials in order to compile graphic charts that will readily supply this information to the user.

## MATERIALS AND METHODS

The following 1.5M (4/0) suture materials were tested:

### 1. Metals

Steel	Monofilament	(Davis and Geck)
	Twisted	(Ethicon)

### 2. Polymers

a Polyamide (nylon)	Monofilament	Ethilon (Ethicon) Nylon (Davis and Geck) Nylon (Deknatel)
	Braided	Nurolon (Ethicon) Supramid*
b Polypropylene	Monofilament	Prolene (Ethicon)
c Polyesters:		
Terelene	Uncoated	Dacron (Davis and Geck) Mersilene (Ethicon) Cottony Dacron (Deknatel)