

Development of barbed, bi-directional surgical sutures

Surgical sutures are the most frequently used biomaterial for wound closure and tissue approximation. However, they rely on the surgeon's ability to tie secured knots, which is a challenging and time consuming process. Improper tying and handling can result in knot breakage or slippage, and potentially wound dehiscence. Further, the knot impedes wound healing, constricts blood flow, distorts tissue, and increase scar formation.

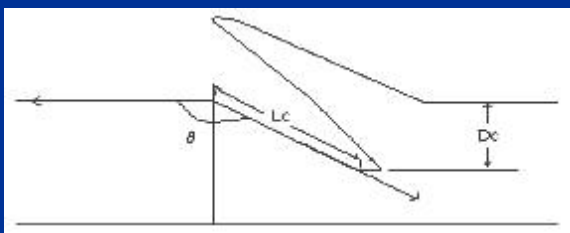
To overcome these problems, SITRA has undertaken a project to develop self-anchoring sutures. The major objectives of the projects are:

- To develop knotless sutures through introduction of bi-directional barbs into absorbable monofilament suture using appropriate techniques.
- Optimisation of quality attributes of barbed, bi-directional surgical sutures for its acceptability.

SITRA has designed and fabricated an equipment for the introduction of Bi – directional barbs into the sutures. Using PDS II (Polydioxanone) monofilament & Monocryl monofilament barbed sutures were produced by SITRA. Evaluation of the sutures for there bio-mechanical properties and wound closure efficiency are in progress.



Barbed Bi-directional Surgical Suture



θ — Cut angle

L_c — Length of the cut

D_c — Depth of the cut

$$L_c = \frac{D_c}{\sin (180 - \theta)}$$

Barb Geometry