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EDITOR'S VOICE

ABSTRACT

Background:

The crucial elements for optimal suturing result are good tissue approximation, handling the problem of tension and security of knots. We propose a use of secure locking knot, which could allow optimal suturing result. The proposed initial secure locking knot is kept in first position without danger of slipping, before finishing it by additional knot of two loops.

Methods:

Sharing of experience.

Result:

The secure locking knot is not bulky, it has strength and it is easy to master. The completed knot may fail by breaking, but never by slippage.

Conclusion:

The proposed secure locking knot allows optimal tissue approximation and it could have application in ophthalmology.

Keywords:

secure locking knot, knot insufficiency, microsurgical technique, ophthalmology.

Guest Lecture: A New Secure Locking Knot in Ophthalmology?

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Background

It has been previously described that the crucial elements for optimal suturing results are good surgical technique for tissue approximation, handling the problem of tension and security of knots.¹ Knots must be simple to perform, be adequate strength and not too large. The large or bulky knots are associated with greater inflammatory reaction, although diminution in size increases the risk of knot insufficiency. A perfect balance between maximal suture strength and minimal foreign-body reaction will achieve success.²

In practice, for tissue reconstruction in ophthalmology are used manually or instrumentally tied 6-0, 8-0 or 10-0 monofilament, multifilament or polyester suture. It is easy to make an error of the amount of force, which is needed for tightening the knots. In other words, tightening could be easily exaggerated with force and produce strangulating necrosis or knot breaking. Opposite, knot is too loose and success of reconstructive procedure is compromised. Sometimes, after the initial tie is placed, in order to prevent loosening the knot by the time, the assistant holds the initial tie with another instrument until the knot is completed. Therefore, we propose use of secure locking knot, already utilized in a variety of areas.^{3,4}

Methods

Suturing technique is simple to master. Two loops are made around the needle holder by passing it over and the under the needle strand of suture held in the non-dominant hand with another instrument (Figure 1). This is initial form for standard two-loop knots, which are not self-locking (Figure 2). The key point is twisting the two loops, thus forming the locking structure. The two strands are twisted around one another by circumscribing the needle holder around the two strands for 360 degrees (Figure 3). The free end of the suture is picked up with the jaws of the needle holder and pulled through the previously formed two-loop structure (Figure 4). The tissue edges are fitted together with amount of force necessary to approximate the structures. The initial tie stay in place without danger of slipping until the knot is completed. The knot is secured with another throw of two loops around the needle holder, by passing it over and under the strand, as at the beginning of the process (Figure 5). The free strand is picked up and pulled through the loop with needle holder held in the dominant hand (Figure 6). The knot is finished by tightening the suture ends in opposite direction (Figure 7).

Result

The proposed technique procedure is simple and allows secure anatomic reconstruction. It is easy to perform, no time consuming and does not make more bulge than the standard knots. The initial knot itself allows optimal edge

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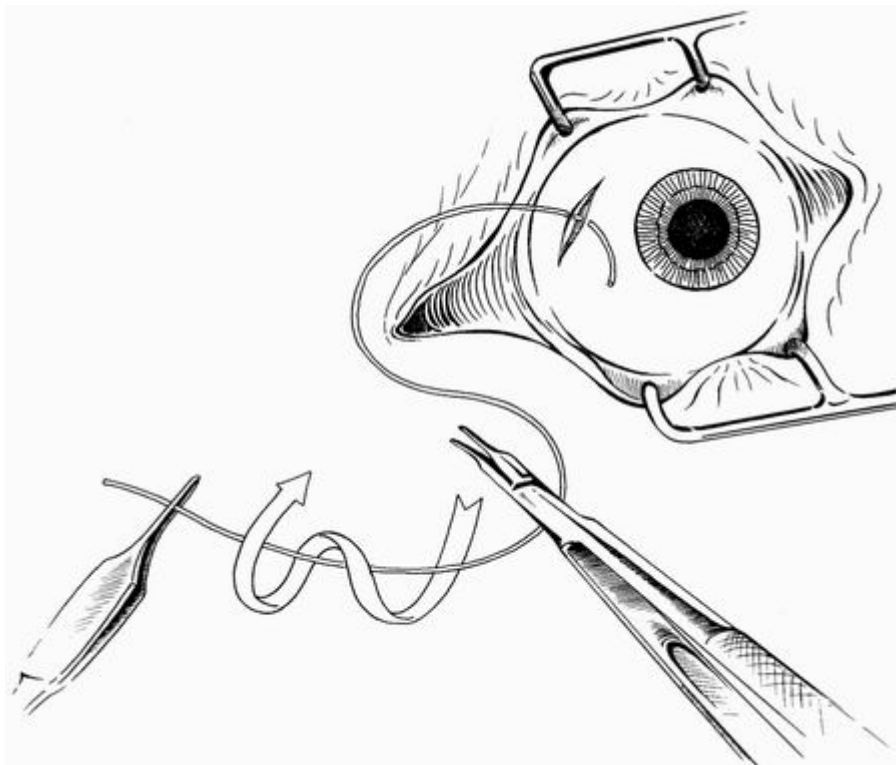


Figure 1: Circumscribing the needle holder around the suture strand held with forceps makes first two loops.

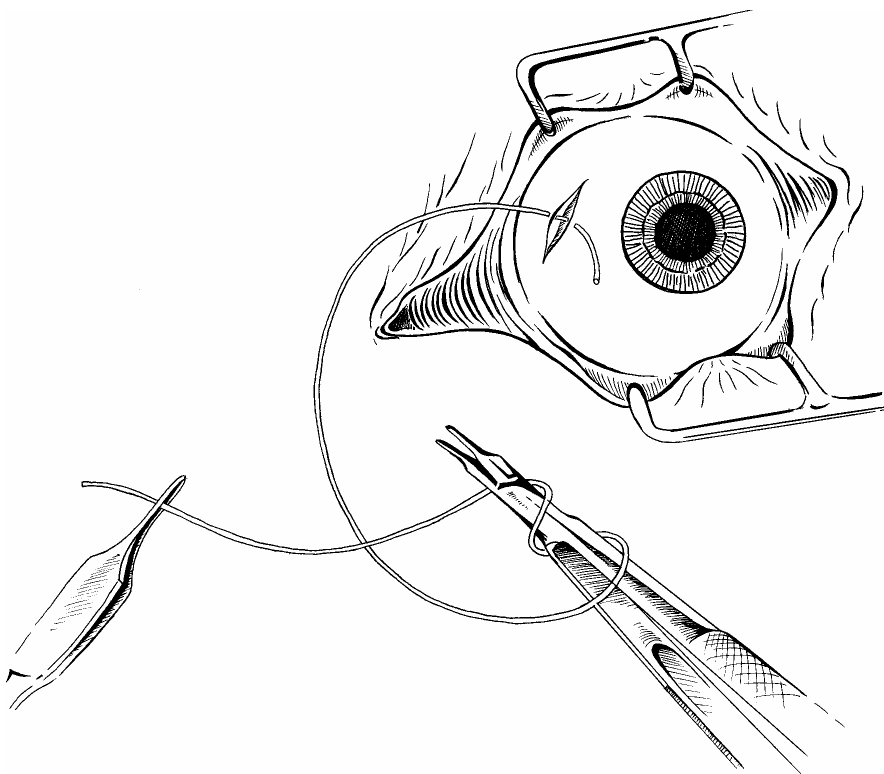


Figure 2: Formation the first part of the initial locking knot in the form of a two-loop knot.

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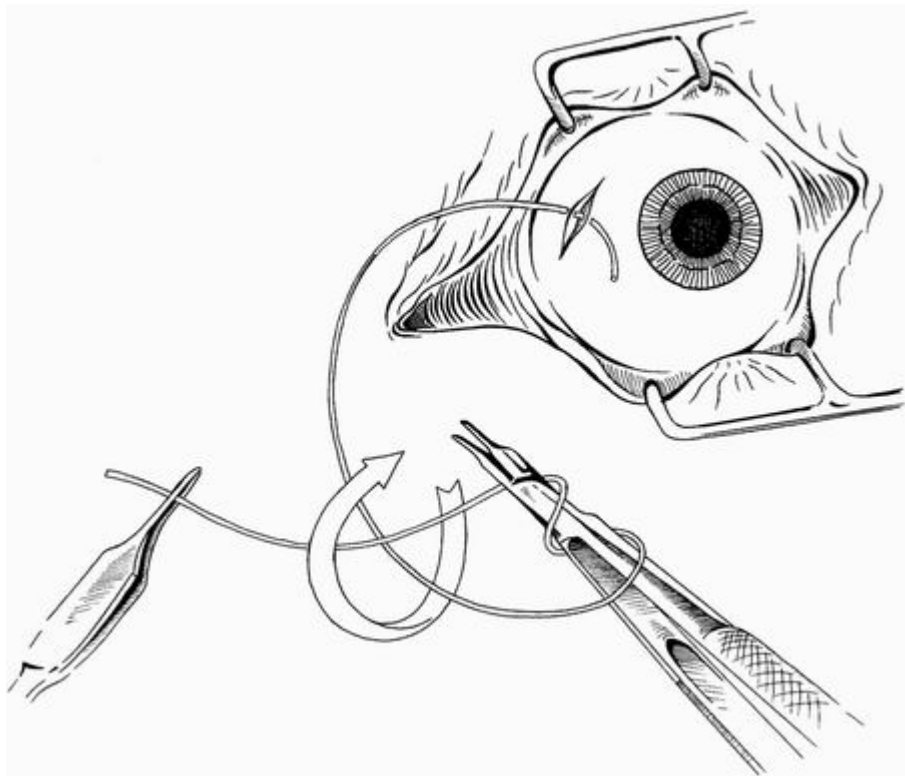


Figure 3: Rotation of the tip of the needle holder around the two strands, twisting the strands around each at 360 degrees of arch. It is important that the tip of the needle holder form these 360 degrees of arch at the crossing of the two strands, thus twisting them around one another.

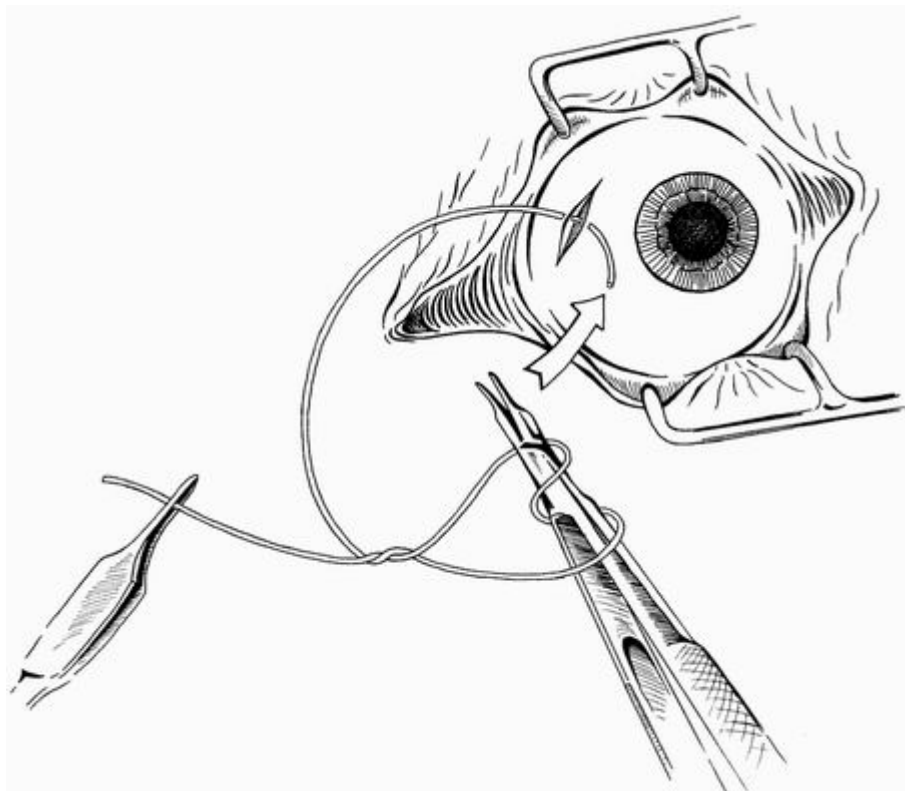


Figure 4: Grasping the free end of the strands with the jaw of the needle holder.

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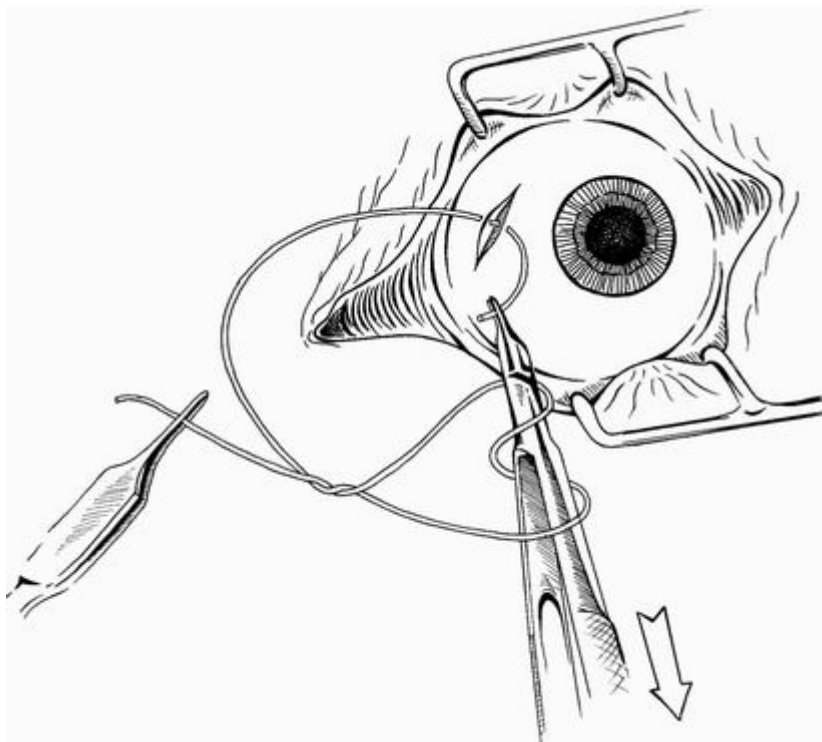


Figure 5: Pulling the free end of the strand through the twisted formation of the two initial loops towards the surgeon.

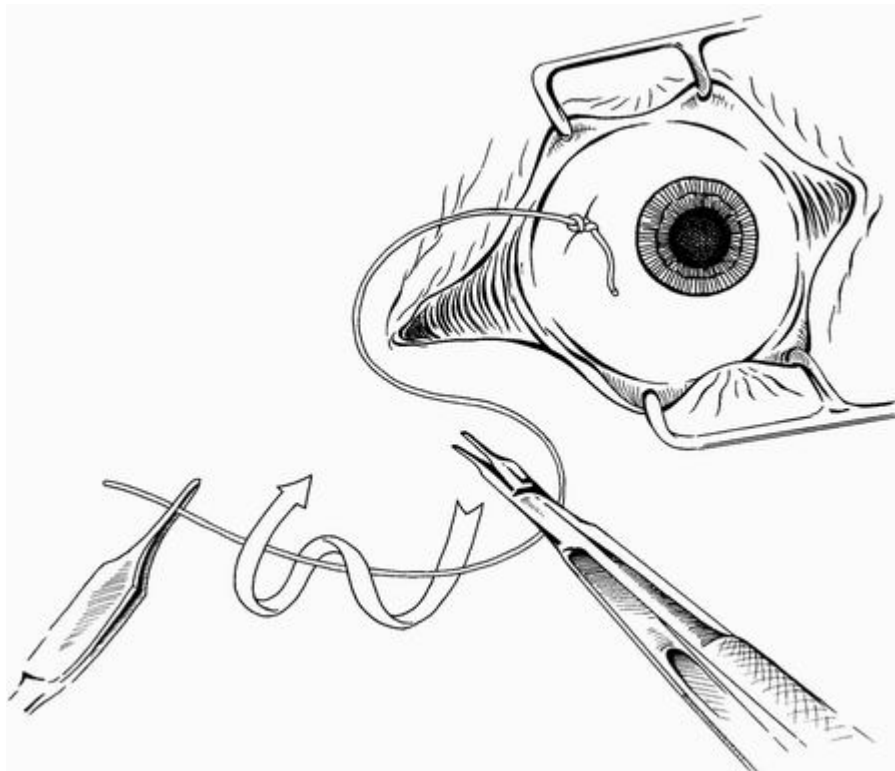


Figure 6: Tissue is approximated and initial knot is formed. There is no danger of the structure loosening until the initial knot is secured with another throw of two loops. Passing the the needle holder over and under the strand forms the loops two times.

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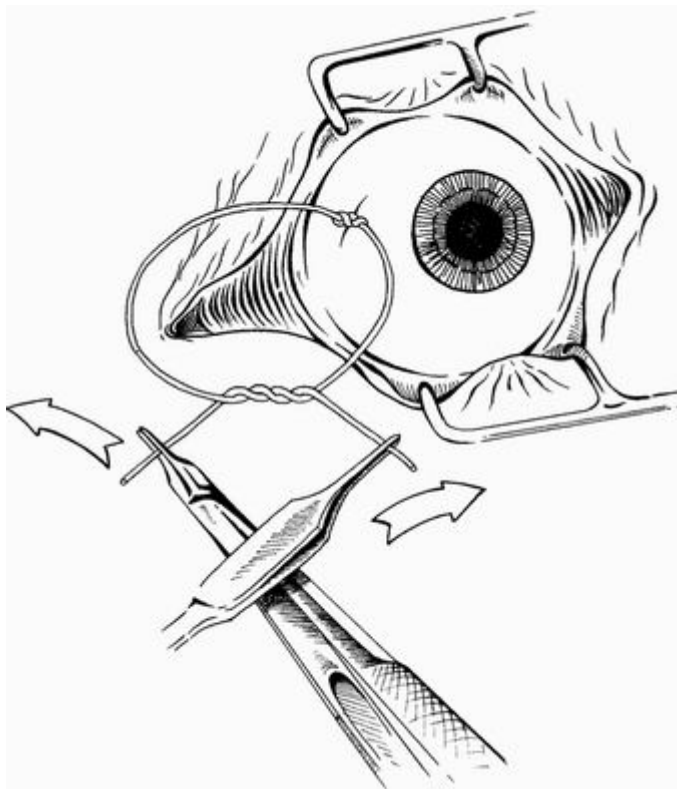


Figure 7: Pulling the instruments in opposite directions tightens the finished knot in a flat configuration.

approximation without fear of slippage, and the tension force applied to the knot is the same intensity before and after locking the knot with another double loop. The completed knot may fail by breaking, but never by slippage.

Conclusion

The crucial elements for optimal suturing results are good surgical technique for tissue approximation, handling the problem of tension and security of knots. In clinical practice we come across on problem of reconstructing the eye structures. The operative procedures are often difficult, time consuming and require surgeon experience and patience. Sometimes, placing the standard knots could not be adequate because of frequent breaking or loosening the knots. Therefore, we propose a use of secure locking knot, which could allow optimal suturing result. The main advantage of the proposed knot is that the exact amount of tension between structures sutured can be predetermined to tighten it just enough to serve the purpose without causing strangulating necrosis. No assistant is needed to hold the initial knot with another instrument because when the initial knot is placed, there is no danger that it will loosen in the time the knot is completed. The secure locking knot is easy to perform, no time consuming and does not make more bulge than the standard knots. The described suturing technique offers safely managing the problem of tissue reconstruction and it has great advantages in clinical ophthalmology.

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