

## Arthroscopic rotator cuff repair: Single rows technique

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### 서 론

1970년대 관절경이 정형외과영역에 소개된 후 회전근 개 파열의 관절경적 진단 및 봉합술기는 현저한 발전을 이룩하여왔다<sup>1)</sup>. 최근 한 조사에 의하면 유동성이 좋은 중 파열의 경우 당신은 어떻게 수술 할 것인가라는 질문에 62%가 관절경적 봉합술을 시행하겠다고 하여 회전근 개의 관절경적 봉합술은 이미 보편화된 술식임을 알 수 있다<sup>2)</sup>. 소 파열이나 중 파열의 경우 관절경적 봉합술의 성공율은 소절개 봉합술이나 개방적 봉합술에 비견할 만큼 높은 성공율이 보고되고 있으나 대 파열의 경우는 아직 소 파열이나 중 파열의 봉합결과에 미치지 못한다<sup>3)</sup>. 초음파나 자기공명영상을 이용한 추적 검사에서 회전근 개가 상완골 조면에 결손 없이 치유되는 경우가 그렇지 못한 경우에 비하여 견관절의 기능이 우수하다고 하여 상완골 조면에 건의 성공적인 재부착이 중요한 예후 인자이다. 상완골 조면에 건의 성공적인 재부착을 위하여 suture anchor placement에 여러 가지 변화가 있어왔고 최근 접촉면적을 증가시키기 위하여 “double row” 수기가 고안되면서 single row 수기와 double row 수기에 따른 회전근 개 봉합술의 성공율 여부에 차이가 있는지가 주요 관심사로 등장하였다. 본 장에서는 두 수기의 우열에 초점을 두기보다는 single row 수기에 대하여 고찰하고자 한다.

### 본 론

#### 1. Single row 수기의 중요 고려요소

##### 1) Optimization of the anchor pull out strength

\* Angle of insertion: deadman theory[4]

##### 2) Minimizing suture cutout through tendon

\* Doubling the number of fixation points of suture to tendon: reduce the load in each suture by 50%<sup>5)</sup>

\* Mac stitch<sup>6)</sup>

##### 3) Suture abrasion related to anchor type

\* Metal anchors demonstrated markedly more suture abrasion than do polymer biodegradable anchors<sup>7,8)</sup>

##### 4) Optimizing suture material

\* Ethibond vs Fiberwire<sup>7)</sup>

Tying a surgeon's knot or a sliding knot with 3 RHAPS using No. 2 Fiberwire increases knot security over the same knot tied with No. 2 Ethibond.

##### 5) Arthroscopic knot<sup>9)</sup>

\* Sliding knot vs. nonsliding knot

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- \* A static surgeon's knot provides the best balance of loop security and knot security within the knot configurations tested in this study.
  - \* The Roeder knot with 3 RHAPs provides the best balance of loop security and knot security within the sliding knot configurations tested in this study regardless of suture type.
- 6) Tendon to bone contact area according to depth of suture passage<sup>10)</sup>
- \* Mean surface area for the the intact footprint:  $242 \text{ mm}^2 \pm 35 \text{ mm}^2$
  - \* 7 mm:  $84 \text{ mm}^2 \pm 30 \text{ mm}^2$  (35% coverage of native footprint)
  - \* 15 mm:  $113 \text{ mm}^2 \pm 18 \text{ mm}^2$  (47% coverage of native footprint)
  - \* 22 mm:  $163 \text{ mm}^2 \pm 28 \text{ mm}^2$  (67% coverage of native footprint)
2. Single row repair techniques of reattaching rotator cuff tears
- 1) Results of Sing-row repairs
- \* Small and medium tears have had good success or healing rate
  - \* Single-row repair in small and medium tears is 87% intact
  - \* Large and massive tears reduced to below 70% to maximum 10%
- 2) Various technique
- \* Medial anchors simple sutures<sup>11,12)</sup>
    - no complications
    - 35 excellent, 11 good, 2 fair, and no poor results:
    - 1 patient had clinical evidence of a failed repair.
    - Forty-four of 45 patients (47/48 repairs) were satisfied with their results.
  - \* Lateral anchors simple or mattress sutures
    - A. Simple suture anchor technique<sup>13)</sup>
      - 78 per cent patients rated the relief of pain as good or excellent on the visual-analog scale. 90 per cent of patients rated their satisfaction as good or excellent
    - B. Inverted mattress sutures technique<sup>14)</sup>
      - complete healing and watertight : 71%
      - partial healing: three.
      - supraspinatus detachment commonly leads to complete tendon healing
3. Cadaver study for foot print coverage
- \* Footprint reconstruction of the rotator cuff using a double-row repair compare to a single-row repair.<sup>15-18)</sup>
  - \* improved initial strength and stiffness
  - \* decreased gap formation and strain a single-row repair.

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- \* increased foot print coverage
- \* higher ultimate tensile load
- \* limitations
- \* chronic retracted tissues in practical practices
  - stability of construct
- \* lack of biological evidence for healing environment
  - tension of cuff reattachment
  - vascularity of repaired tissue

#### 4. Functional and structural outcome after rotator cuff repair: single-row versus dual-row fixation<sup>19)</sup>

- \* Arthroscopic rotator cuff repair yielded successful functional outcomes without significant difference between single and dual-row fixation techniques. However, dual-row repairs excelled in structural outcome over the single-row technique.

## 결 론

Single row 수기를 이용한 회전근 개의 소 파열 및 중 파열 봉합은 임상 결과가 우수하고, double row 수기가 생체에서의 stability of construct, tension of cuff reattachment, vascularity of repaired tissue 등의 “Healing environment” 가 single row 수기에 비하여 우수함이 아직 입증되지 않아 수술 수기가 상대적으로 쉽고, 요구되는 기구 및 내고정물의 추가적 비용이 적어 경제적인 측면에 장점이 있는 single row 수기는 여전히 추천되는 수술수기라고 생각한다.

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