

Diagnostic arthroscopy of the knee: Brief history and the simple three portal technique

(Diagnostik diz artroskopisi: Kısa tarihçe ve basit üçlü giriş tekniği)

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İlk endoskopi çalışmaları 1806 yılında Phillip Bozzini'nin yayınlarına dayansa da insan dizine ilk artroskopi girişimi 1919'da Tokyo'da Kenji Takaji tarafından sistoskop kullanılarak yapılmıştır. 1960'da Watanabe tungsten ışık kaynaklı görece daha geniş açılı görüş sağlayan no 21 artroskopunu geliştirdi. 1962'de ise ilk artroskopik menisektomi gerçekleştirdi. 1974'de Uluslararası Artroskopi Derneği kuruldu. 3 yıl sonra 1977'de Uluslararası Diz Birliği oluşturuldu. Artroskopik cerrahi temel olarak tanınal ve operatif olarak ayrılabilir. Her iki girişimin de standart ameliyathane koşullarında ve cerrahi prensipler içinde gerçekleştirilmesi gerekir. Diagnostik artroskopi: Pozisyonu supine pozisyonda her iki alt ekstremité ekstansiyonda femur distaline lateral bar konarak yapılır. Anestezi, genel anestezi, epidural ve intradural anestezi, rejyonel blok veya lokal anestezi kullanılabilir. Turnike: Bazı cerrahlar rutin olarak tercih ederken bazıları kanamaya karşı irigasyon sistemi ile net bir görüntü sağlayabilmektedir. Teknik: a) Anterolateral ve anteromedial girişler eklem yüzeyinin 1.5 cm yukarısında patellar ligamanın her iki yanında yer alır ve 11 nolu bistürü ile açılmalıdır. Superomedial giriş ise irigasyon girişi olarak kullanılır. Belirtilen girişlerden trokar yerleştirildikten sonra ilk olarak eklem fizyolojik solüsyon ile yıkanır ve şişirilir. Takiben 30°'lik teleskop gönderilir. b) Işık kaynağı eklem yüzeyine paralel yerleştirilmektedir ve ilk olarak gözleme superomedialden başlanır. c) Takiben teleskop 90° çevrilip patella alt yüz gözlenir. d) Teleskopa 180° rotasyon yapıp diz valgus ve 20° fleksiyonda iken medial eklem aralığı gözlenir. 45°'lik lateral bir rotasyon ile de çapraz bağları görmek mümkündür. e) Lateral kompartmanı gözlemek amacıyla diz varusa veya 4 figürüne alınır. Teleskopun pozisyonu korunur. f) Diagnostik artroskopi mutlaka antero-medial girişten gönderilen hook kontrolü ile sonlandırılmalıdır.

Anahtar kelimeler: Arthroscopy, arthroscopic portals

History of arthroscopy dated back to the first report of endoscopy in clinical practice (2) by Phillip Bozzini in 1806. Although the first recorded endoscopic examination (7) of a human knee joint occurred in 1919 in Tokyo by Kenji Takaji using a cystoscope.

Eugen Bircher, Switzerland 1921; Micheal Burman, New York 1934; Masaki Watanabe, Tokyo 1967; I Macnab and R W Jackson both in Toronto 1963 and 1964 respectively. All of them worked relentlessly at different time and developed different grades of arthroscope, incorporating lens system into endoscope.

In 1960 (7), Watanabe developed No 21 Arthroscope which uses tungsten light for illumination, lens with wide angle of vision and amazing depth of focus at its tip. The same Watanabe (8) in 1962 performed and reported the first arthroscopic meniscectomy. About this same period, reports of endoscopy in clinical practice was first reported in the former Soviet Union Republics by N.A. Polyak, at the 1962 scientific session of Sverdlovskaya institute of orthopaedia and traumatology. Polyak used pediatric cystoscope to examine the knee joints of his patients.

His work was further improved on by various indigenous arthroscopists such as: C.L. Kmelevskaya 1964, V.I. Kirsanov 1965, V.F. Varnepa 1969 and O.A. Ushakova 1975.

In 1974 the International arthroscopic association (IAA) was formed. Three years later (1977), the

International Society of the knee (ISK) was also formed. However, the outlook for arthroscopy improved with the development of the hopkins rod lens and the publication in 1978 of the first results of Arthroscopic meniscectomy.

Arthroscopic surgery basically includes diagnostic and operative arthroscopy. All procedures are performed in standard surgical room environment in accordance to all surgical principles.

Diagnostic procedure

I. Position: The patient lies supine on the table, with both lower extremities extended and a lateral bar is attached to the lateral side of the thigh (femur) 3-4 cm from the superior border of the patellar of the operative knee.

II. Anaesthesia: General anaesthesia, epidural and intra-dural anaesthesia, regional blocks and even local anaesthesia can be employed to perform diagnostic arthroscopy. However, the authors preferred epidural anaesthesia whose effect is further facilitated by infiltration of 1.5-2 mls of chosen local anaesthetic solution at the point of incision (Fig. 1).

For a period of over 13 years of arthroscopic practice, senior authors (Ramon and Garcia) recorded satisfactory results with this form of anaesthesia.

III. Tourniquet: This is applied on the upper 1/3 of the thigh (femur) of the operative knee. Some surge-

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Fig. 1: Point of anterolateral incision



Fig. 2



Fig. 3: Point of incision for the superomedial portal

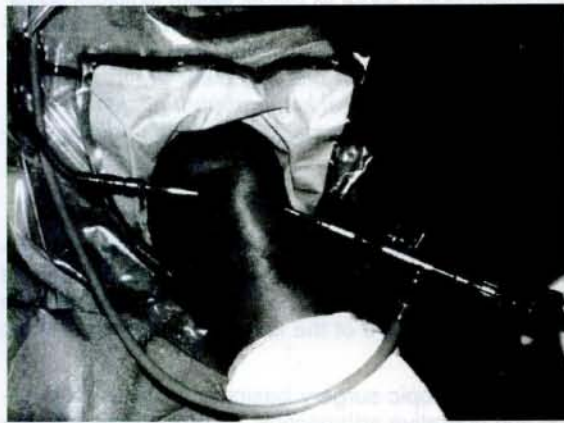


Fig. 4 a: Fitting and connecting up the arthroscopic set

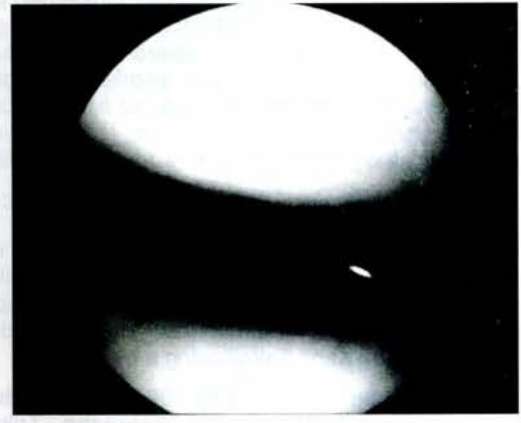


Fig. 4 b: Irrigation trochar at the superiomedial compartment

ons use tourniquet routinely, but we use it only when intra-operative bleeding cannot be controlled by the inflow and outflow irrigation system, thus causing blurred vision.

IV. Surgical technique: In the operating room it is obligatory for the surgeon to re-examine the knee before cleaning and draping the patient.

Portals

a) Anterolateral and anteromedial portals are located about 1 cm above the knee joint line or 1.5 cm above the anterior margin of the tibial head. At the edge of the patellar ligament, using size 11 surgical blade. See Fig. 2, showing anterolateral incision point.

Superomedial portal (irrigation portal) is located at the confluence of superior border line and the medial borderline of the knee.

Using size 11 surgical blade, this incision should not exceed the skin layer. Insert the throcar and the arthroscopic sheath into the joints, then fit the inflow

and outflow tubes (Fig. 3). Initially wash/irrigate the joints using physiological solution then distend the joint by closing the outflow tube.

Subsequently insert the 30° telescope into the joint via arthroscopic sheath. This is then connected to the camera and the arthroscopic set (Fig. 4a).

b) The light post of the arthroscopic lying at the same level with the knee, the top directed medially. The telescope will displace on the screen for inspection, the supero-medial part of the knee (Fig. 4a and 4b)

c) The patellar and its surface is inspected by rotating the arthroscope light post downward through 90° i.e. the tip directed downward.

d) Pass the arthroscope over the medial femoral condyle. Rotate the light post through 180°, such that the post is directly on the knee and the tip directed upward simultaneously and carefully too, put the knee in valgus position, 20° flexed and medially rotate the leg. This displaces the medial joint compartment for inspection (Fig. 5). Further rotation of the arthroscope 45° laterally with the knee flexed 60° exposes the

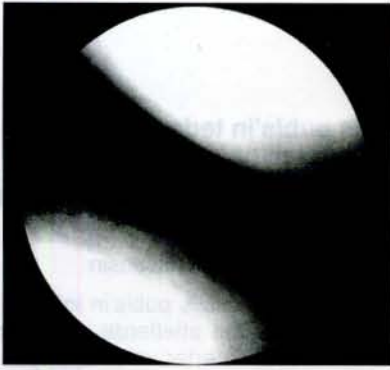


Fig. 5: The medial meniscus in the medial compartment



Fig. 6: Anterior cruciate ligament



Fig. 7: Structures in the lateral gutter of the knee



Fig. 8

cruciate ligaments and inter-condylar spaces for diagnostic inspection (Fig. 6)

e) Inspection of lateral compartments of the joint is done by putting the knee in varus position (i.e. placing the operated leg on the non-operated leg, thus forming figure of number four) with 20° flexion of the knee and the foot, slightly rotated medially. The arthroscope maintains its position more or less in this maneuver.

f) The knee is now returned to its extension and the arthroscope focused directly on the lateral side of the joint. The light post parallel to the operating knee and its tip pointing at the patients head. This allows for inspection of the lateral border of the external me-

niscus, popliteus tendon and the lateral gutter (Fig. 7). Evidently, the important structures of the knee has been inspected. But diagnostic arthroscopy cannot be said to be complete and successful without the introduction of the hook probe into the cavity via anteromedial portal described above. See Fig 8., anteromedial incision point. Hence for each procedure described above, the integrity of the displaced, visualized structure are physically tested and confirmed by the probe.

On the average, diagnostic arthroscopy is performed in 15-30 minutes. Duration of operation is definitely affected by the surgeon expertise and other local factors. But operative duration exceeding 60 minutes are not encouraged.

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