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OVERVIEW

- INTRODUCTION AND DEFINITION
- PHYSIOLOGIC MOVEMENTS OF TMJ
- PATHOGENESIS OF "ID"
- AETIOLOGY
- CLINICAL AND DIAGNOSTIC FEATURES OF "ID"
- MYOFASCIAL PAIN DYSFUNCTION SYNDROME (MPDS)
- CONDYLAR DISLOCATION
- CLINICAL FEATURES
- MANAGEMENT
  - ARTHROCENTESIS AND LAVAGE
  - TMJ ARTHROSCOPY
  - AND OTHERS, CONDYLOTOMY, CONDYLECTOMY,DISC REPOSITIONING, etc.

INTRODUCTION

- DEFINITION: INTERNAL DERANGEMENT(ID) IS A DISRUPTION OF INERNAL ASPECTS OF TMJ, IN WHICH AN ABNORMAL RELATIONSHIP EXISTS BETWEEN THE DISC AND THE CONDYLE,FOSSA AND ARTICULAR EMINENCE.
- THIS CONDITION WAS FIRST DESCRIBED BY HEY AND DAVIES (1814) AS A LOCALIZED MECHANICAL FAULT INTERFERING WITH SMOOTH ACTION OF A JOINT AND CAUSES MOMENTARY CATCHING, CLICKING,POPPING & LOCKING.
- ASSOCIATED CHANGES LIKE SYNOVITIS, THERE CAN BE INTERCAPSULAR SCARRING OR ADHESIONS WITHIN THE JOINT, HAEMORRHAGE,FIBROCARTILAGINOUS METAPLASIA,DYSTROPHIC CALCIFICATIONS AND OSTEOARTHRITIS.
- AN ANTERIOR DISC 'DISPLACEMENT' IS THE MOST COMMON INTERNAL DERANGEMENT, BUT ANTEROMEDIAL,MEDIAL & ANTEROLATERAL DISPLACEMENTS ARE ALSO SEEN.

- WHEN THE MOUTH IS OPENED,THE MANDIBULAR HEAD ROTATESAROUND A COMMON HORIZONTAL AXIS IN A COMBINATION WITH A GLIDING FORWARD AND DOWNWARD MOVEMENT IN CONTACT WITH THE LOWER SURFACE OF THE ARTICULAR DISCS.
- THE ARTICULAR DISC MOVES FORWARD AND DOWNWARD ON THE TEMPORAL BONES.THIS RESULTS FROM THE ATTACHMENTS OF EACH DISC TO THE LATERAL AND MEDIAL POLES OF THE CONDYLESAND FROM THE CONTRACTION OF LATERAL PTERYGOID.
- THE FORWARD GLIDING OF THE DISC CEASES WHEN THE POSTERIOR ATTACHMENT TO THE TEMPORAL BONE HAS BEEN STRETCHED TO THE LIMITS.
- FURTHERMORE, HINGING AND ANTERIOR GLIDING MOVEMENT OF EACH CONDYLES CONTINUES UNTILTHEY ARTICULATE WITH THE MOST ANTERIOR PART OF THE DISC AND THE MOUTH IS OPEN FULLY.
- WHILE CLOSING ,THE MOVEMENTS ARE REVERSED, MANDIBLE GLIDES BACKWARD & NTHEN HINGES, FINALLY RELAXES THE DISC TO GLIDE BACKWARD AND UPWARD ON THE TEMPORAL BONE.

PATHOGENESIS OF INTERNAL DERANGEMENT

- INTERNAL DERANGEMENT IS A PROGRESSIVE ANTERIOR AND MEDIAL SUBLUXATION OF MENISCUS FROM ITSNORMAL POSITION AT REST.
- PREVIOUS TRAUMA MAY LEAD TO STRETCHING OF LOWER LAMINA OF BILAMINAR ZONE, ALLOWING THE POSTERIOR BAND TO SUBLUX FORWARD IN RELATION TO CONDYLAR HEAD IN CENTRIC RELATION, ABNORMALITY SEEN AS A CLICK OR OPENING.
- THE OPEN CLICK REPRESENTS THE POSTERIOR BAND RELOCATING POSTERIORLY OVER THE CONDYLE FROM ITS SUBLUXED POSITION.
- PAIN AT THIS STAGE REPRESENTS THE MENISCUS BEGINNING TO LOSE ITS INSERTION INTO LATERAL POLE.
- FURTHER TRAUMA CAUSES MENISCUS TO SUBLUX PROGRESSIVELY FORWARD AND MEDIALLY, MAKING IT DIFFICULT TO REPOSITION IT ON CONDYLAR HEAD.
- FORMATION OF EXUDATES, AND EVENTUAL ADHESIONS AND FIBROSIS MAINTAINS THE POSITION OF MENISCUS SUBLUXED HENCE CAUSING JOINT TO BECOME LOCKED.

AETIOLOGY

- TRAUMA
  - TRAUMA TO THE TMJ CAN BE MICROTRAUMA OR MACROTRAUMA ACCORDING TO THE MAGNITUDE OF TRAUMATIC FORCE.

- MACROTRAUMA: IT CAN BE DIRECT OR INDIRECT.
  - DIRECT TRAUMA : TRAUMA TO MANDIBLE IN OPEN MOUTH POSITION
    CAN ALSO BE IATROGENIC –
    INTUBATION PROCEDURES
    THIRD MOLAR EXTRACTIONS
    LONG DENTAL APPOINTMENTS
    OVEREXTENSION OF JAW AS YAWNING.
  - INDIRECT TRAUMA: CERVICAL FLEXION-EXTENSION INJURY.
- MICROTRAUMA : BRUXIM OR CLENCHING
  MALOCCLUSION -- TRAUMATIC

CLINICAL AND DIAGNOSTIC FEATURES

- HISTORY OF SEVERE PAIN ON YAWNING.
- HISTORY OF DIRECT TRAUMA TO THE JOINT YEARS EARLIER.
- CLICKING SOUND : IN THE JOINT DURING MOUTH OPENING AND CLOSURE.
- JOINT TENDERNESS SPECIALLY WITH FUNCTION.
- DEVIATION TO AFFECTED SIDE: THIS CHARACTERISTICALLY OCCURS IN DISC DISPLACEMENT WITH OR WITHOUT REDUCTION.
- DISC DISPLACEMENT WITH REDUCTION: AFTER THE INITIAL 10mm OF MOUTH OPENING(ROTATION OR HINGE) JAW DEVIATES TO AFFECTED SIDE.
- DISC DISPLACEMENT WITHOUT REDUCTION: JAW DEVIATION STARTS FROM THE INITIATION OF MOUTH OPENING AND PROGRESSES TILL END OF MOUTH OPENING.
- TRISMUS: PRESENT ONLY IN DISC DISPLACEMENT WITHOUT REDUCTION.
- ELIMINATION OF PAIN FOLLOWIN LOCAL ANAESTHESIA OF THE AFFECTED JOINT.

MYOFACIAL PAIN DYSFUNCTION SYNDROME

- TMJ JOINT PAIN/ DYSFUNCTION SYNDROME NAMED BY SCHWARTZ, ALSO KNOWN AS FACIAL ARTHROMYALGIA , MPDS, TMJ JOINT DYSARTHROSIS, etc.
- IT IS THE ONLY SITUATION IN WHICH NO ORGANIC LESION HAS BEEN DETECTED CLINICALLY.
- SYMPTOMS: PAIN , LIMITATION OF MANDIBULAR MOVEMENT , MUSCLE HYPERACTIVITY, ABNORMAL MUSCLE ACTIVITIES, CLICKING, LOCKING AND EMOTIONAL FACTORS etc.
- SIGNS: JOINT TENDERNESS, MUSCLE TENDERNESS, ABNORMALITIES OF MANDIBULAR MOVEMENT.
- RADIOGRAPHY: LATERAL TRANSCRANIAL VIEW FOR NON DEGENERATIVE DISEASE.

  * TRANSPHARYNGEAL VIEW FOR DEGENERATIVE DISEASE.

  * TOMOGRAPHY

  * ARTHROGRAPHY (INJECTION OF RADIOPAQUE FLUIDS).

CONDYLAR DISLOCATION

- DISLOCATION OF THE TMJ OCCURS WHEN TH EMADIBULAR CONDYLE IS DISPLACED ANTERIORLY BEYOND THE ARTICULAR EMINENCE.
- IN 1832, SIR ASTLEY COOPER PROPOSED PRINCIPLES FOR DISLOCATION AND INTRODUCED THE TERMS LIKE COMPLETE DISLOCATION AND SUBLUXATION.
- SUBLUXATION: IS DEFINED AS A DISPLACEMENT OF CONDYLEOUT OF GLENOID FOSSA AND ANTEROSUPERIORLY TPO THE ARTICULAR EMINENCE,WHICH CAN BE REDUCED BY THE PATIENT, CAN BE BOTH UNILATERAL OR BILATERAL.
- TRUE DISLOCATION: IS ONE IN WHICH THE PATIENT CANNOT REDUCE IT BY HIMSELF AND REQUIRES EXPERT ASSISTANCE FOR REDUCTION.
- HABITUAL OR RECCURENT DISLOCATION: REFERS TO FREQUENT AND REPEATED EPISODES OF RECURRENT DISLOCATION THAT CAN BE MANIPULATED BACK INTO POSITION.
- PATHOGENESIS : 1) THE LAXITY OF THE LIGAMENTS ASSOCIATED WITH THE JOINTS.

  2) DYSSYNCHRONOUS MUSCLE FUNCTION.

  3) BONY ARCHITECTURE OF JOINT SURFACES. (MYRHAUG)

  4) DEGENERATIVE JOINT DISEASES.

AETIOLOGY AND CLINICAL FEATURES OF "CD"

- AETIOLOGY: 1) INTRINSIC CAUSES : YAWNING, SEIZURE DISORDER OR VOMITING.

2) EXTRINSIC CAUSES:

A. TRAUMA : INJUDICIOUS USE OG GAG DURING INTUBATION, DENTAL EXTRACTION, FLEXION- EXTENSION INJURY TO MANDIBLE.
B. OCCLUSAL FACTORS: EXCESSIVE TOOTH ABRASION, SEVERE MALOCCLUSION, LOSS OF DENTITION.
C. CONNECTIVE TISSUE DISORDERS: HYPERMOBILITY SYNDROME, EHLER DANLOS SYNDROME , MARFAN SYNDROME.
D. PSYCHOGENIC ORIGIN: HABITUAL DISLOCATION
E. DRUGS: ANTIPSYCHIATRIC DRUGS, PHENOTHIAZINE- MAY PRODUCE SPASMS.

- CLINICAL FEATURES: INABILITY TO CLOSE THE MOUTH, PREAURICULAR DEPRESSION EXCESSIVE SALIVATION, TENSE SPASMATIC MUSCLES OF MASTICATION.

1. UNILATERAL DISLOCATION: MOUTH OPEN, MANDIBLE DEVIATED TO OPPOSITE.
2. BILATERAL DISLOCATION: MOUTH OPENS IN PROTRUSION,RESTRICTED RANGE OF MANDIBULAR MOVEMENTS AND BILATERAL PREAURICULAR HOLLOW.

ARTHROCENTESIS AND LAVAGE

- OBJECTIVES: 1) TO IMPROVE THE DISC MOBILITY.
  2) TO REDUCE THE JOINT INFLAMMATION.
  3) REMOVE THE RESISTANCE TO CONDYLE TRANSLATION.
  4) EARLY PHYSIOTHERAPY AND ELIMINATING PAIN.
- INDICATIONS: ALL PATIENTS WHO ARE REFRACTORY TO CONSERVATIVE TREATMENT.
- ADVANTAGES: 1) SIMPLE TECHNIQUE
  2) LESS ARMAMENTARIUM
  3) LESS INVASIVE
  4) INEXPENSIVE AND HIGHLY EFFECTIVE
- HYPOTHESIS: DUE TO LAVAGE , PAIN MEDIATORS LIKE PROSTAGLANDIN E2 AND LEUKOTRIENE B GET WASHED OUT HENCE RELIEVING THE PAIN AND INFLAMMATION.THE PERSISTENT INABILITY OF THE DISC TO SLIDE IS SIMPLY REVERSED BY LAVAGE HYDRAULICALLY TO REESTABLISH THE NORMAL "MMO".
- TECHNIQUE:

1. PATIENT SUPINE WITH HEAD TURNED ,TMJ MOVEMENT IS PALPATED, TWO LINES ARE MARKED AS ARTICULAR FOSSA AND EMINENCE.
2. AURICULOTEMPORAL NERVE BLOCK GIVEN USING 0.5 ml OF 2% OF LIGNOCAINE.

CONT'D..

- A 18 OR 19 GAUGE,1.5 inch LONG NEEDLE IS THEN INSERTED TO THE SUPERIOR JOINT COMPARTMENT CORRESPONDING TO THE POSTERIOR MARK UPTO 1 inch IN DEPTH.
- THEN ANOTHER 18 OR 19 GAUGE,1.5 inch LONG NEEDLE IS INSERTED CORRESPONDING TO ARTICULAR EMINENCE.
- 10 cc SYRINGE IS FILLED UP WITH RINGERS LACTATE SOLUTION AND CONNECTED TO THE FIRST NEEDLE AND IS PUSHED THROUGH THE JOINT SPACE AND SHOULD COME OUT OF SECOND NEEDLE LIKE A " FOUNTAIN", BEFORE THIS PATIENTS FULL MOUTH IS STRETCHED MANUALLY OR WITH A MOUTH PROP.
- INITIALLY BLOOD TINGED OR TURBID,THE FLUID BECOMES CLEAR ON UPTO 200 ml OF FLUID REJECTION FOLLOWED BY APPLICATION OF 1ml OF HYDROCORTISONE BEING INJECTED TO THE JOINT SPACE , BEFORE NEEDLE REMOVAL.
- <u>POSTARTHROCENTESIS MEDICATION</u> : <u>NAPROXEN SODIUM 275 mg TBD & DIAZEPAM 2.5-5mg BED TIME FO RTWO WEEKS WITH THE APPLICATION OF A BITE BLOCK IS RECOMMENDED.</u>
- SOFT DIET WITH PHYSIOTHERAPY , THE PROCEDURE CAN BE REPEATED AFTER A GAP OF ONE WEEK FOR THREE TO FOUR TIMES , 80% OF PATIENTS ARE RELIEVED FROM PAIN , CLICKING AND GRATING AND TO HELP THEM REESTABLISH THEIR NORMAL 'MMO'.

TMJ ARTHROSCOPY

- TMJ ARTHROSCOPY CONSIST OF A SPECIALLY DESIGNED FIBEROPTIC ENDOSCOPE INTO A JOINT COMPARTMENT FOR OBSERVATION AND THERAPEUTIC PURPOSE, MADE POPULAR BY OHNISHI,1975.
- TYPES: 1) BASIC SINGLE PUNCTURE TECHNIQUE

  2) DOUBLE PUNCTURE TECHNIQUE FOR THERAPEUTIC AND SURGERY.
- INDICATION: AFTER ALL CONSERVATIVE TREATMENT HAD FAILED.

1. DISC DYSFUNCTION
2. OSTEOARTHROSIS
3. SYNOVIAL DISEASE
4. HYPERMOBILITY DUE TO DISC PROBLEMS
5. HYPERMOBILITY WITH SEVERE PAIN.

- CONTRAINDICATIONS:

1. REGIONAL INFECTION
2. PRESCENCE OF TUMOUR
3. USUALMEDICAL CONTRAINDICATION TO SURGERY.

TECHNIQUE

- ANAESTHESIA USUALLY LOCAL FOR DIAGNOSTIC PURPOSE WHILE GENERAL ANAESTHESIA FOR THERAPEUTIC AND SURGICAL PROCEDURE.
- POSITION OF THE PATIENT AND INSTRUMENTATION: DORSAL SUPINE POSITION WITH HEAD ROTATED ,AFFECTED SIDE IS SUPERIOR, PATIENT DRAPED WITH ASEPSIS.
- MARKING: A LINE IS DRAWN FROM MID TRAGUS OF EAR TO LATERAL CANTHUS OF EYE.FIRST LINE IS DRAWN 10mm ANTERIOR TO TRAGUS ,SECOND 2mm INFERIOR TO CANTHUS TRAGUS LINE, WHICH IS THE FIRST SITE OF PUNCTURE. WHILE IN DOUBLE PUNCTURE TECHNIQUE, ANOTHER LINE IS DRAWN 20mm ANTERIOR FROM MID TRAGUS LINE AND 10mm BEOW THE CANTHUS TRAGUS LINE, WHICH IS THE SECOND SITE FOR PUNCTURE.
- 1-3 cc OF LOCAL ANESTHESIA IS INJECTED USING A 18 OR 19 GAUGE 1.5INCH LONG NEEDLE INTO SUPERIOR JOINT SPACE INFERIORLY,POSTERIORLY AND LATERALLY.
- SINGLE PUNCTURE TECHNIQUE: THE SHARP TROCAR ALONG WITH CANNULA, SHOULD BE ENTERED ANTEROSUPERIORLY (10*ANGLE TO HORIZONTAL) AIMING AT THE ROOF OF GLENOID FOSSA FOR UPTO 5-10mm, TROCAR IS REPLACED WITH BLUNT OBTURATOR FOR UPTO25-45mm AND THEN IS REMOVED ALONG WITH THE BACKFLOW OF FLUID.
- THEN THE JOINT LAVAGE IS CARRIED OUT TO REMOVE BLOOD OR ANY PUNCTURE DEBRIS BY FLUSHING 20-25cc OF RINGERS LACTATE SOLUTION, FOLLOWED BY INSERTION OF ARTHROSCOPE, SURGERY LIKE SHAVING, INCISING OR RESECTION OF THE TISSUE CAN BE DONE.

OCCLUSAL SPLINTS

- INDICATION: * TO TEMPORARY DISENGAGE THE TEETH.

  * TO CREATE A BALANCED JOINT-TOOTH STABILIZATION

  * TO REDUCE SPASM, CONTRACTURE AND HYPERACTIVITY.

  * TO IMPROVE/RESTORE THE VERTICAL DIMENSION.

- TYPES: 1) STABILIZATION SPLINT: 12-18 Hr USE IS ADVOCATED FOR OVER 4-6 MONTHS, MOUNTED OVER MAXILLARY TEETH, COVERING THE OCCLUSAL AND INCISAL SURFACE.

- IT IS SIMILAR TO HAWLEYS PLATE BUT OCCLUSAL COVERAGE IS ADDED.

THIS DEVICE REDUCES THE LOAD ON RETRODISCAL AREA HENCE RELIEVES THE PAIN.

- NOWADAYS RESILIENT SPLINTS ARE ALSO AVAILABLE WHICH ARE NONACRYLIC TO PROTECT FROM TRAUMA AND BRUXISM.

- 2) RELAXATION SPLINTS: USED FOR DISENGAGEMENT OF TEETH FOR A SHORT PERIOD OF TIME (4 WEEKS). FABRICATED OVER MAXILLARY INCISORS, A PLATFORM DISENGAGES THE ANTERIOR TEETH.

GRAPHICS

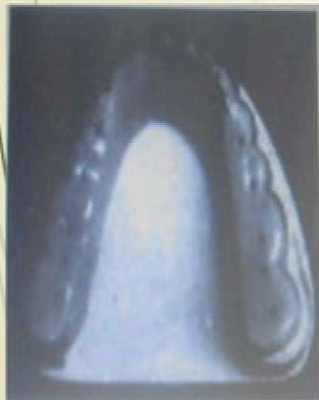


Fig. 23.12: Occlusal splint

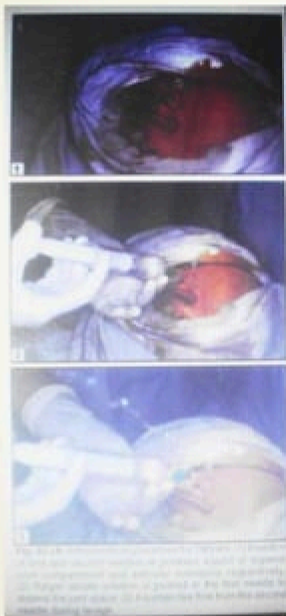


Fig. 23.17: Instrumentation for arthroscopy. Arthroscope camera, trocar, cannula, biopsy forceps, scissors, probes, blades, etc.

CONT'D..

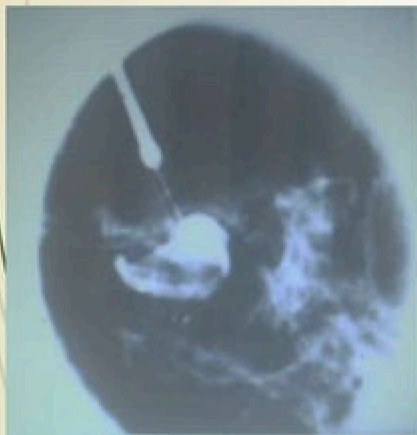
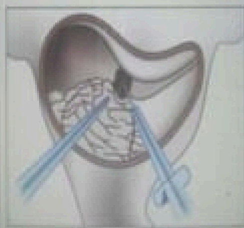
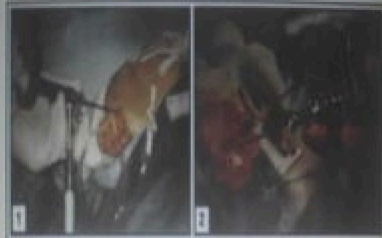
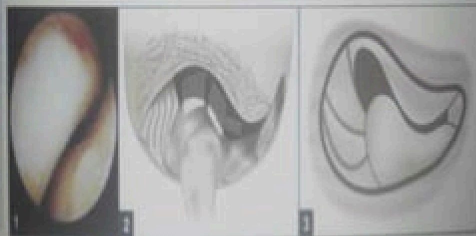
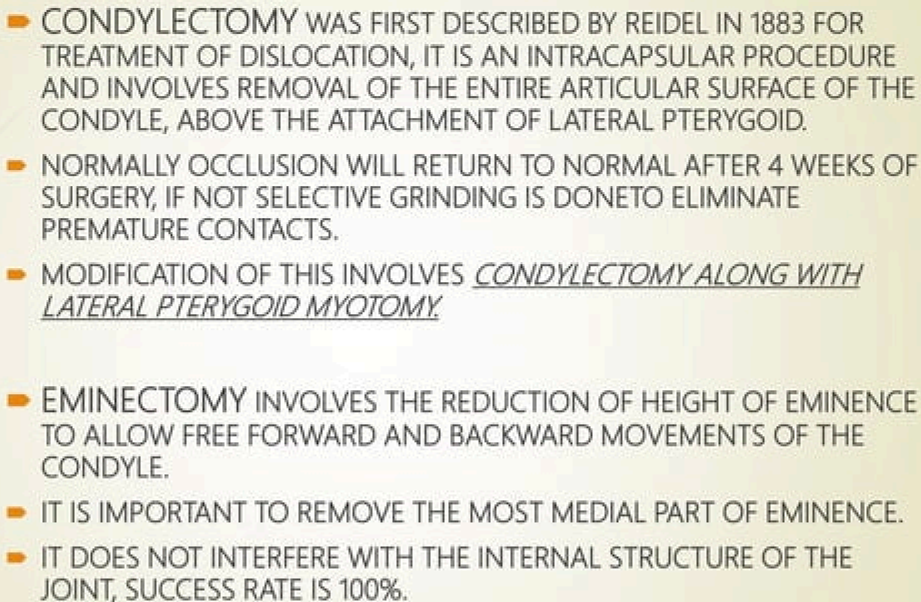


Fig. 15.4 • TMJ arthrogram. • Contrast is injected into the joint spaces below and, sometimes, above the disc. Consequently, the disc is outlined rather than directly seen





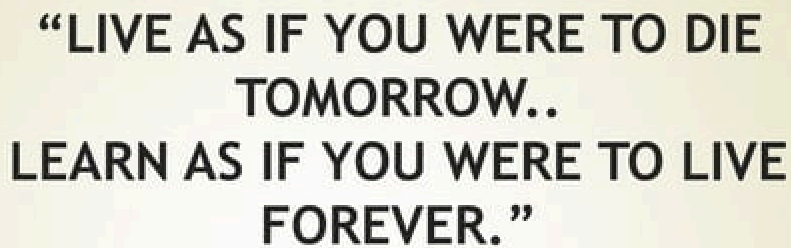



CONDYLECTOMY WAS FIRST DESCRIBED BY REIDEL IN 1883 FOR TREATMENT OF DISLOCATION, IT IS AN INTRACAPSULAR PROCEDURE AND INVOLVES REMOVAL OF THE ENTIRE ARTICULAR SURFACE OF THE CONDYLE, ABOVE THE ATTACHMENT OF LATERAL PTERYGOID.
NORMALLY OCCLUSION WILL RETURN TO NORMAL AFTER 4 WEEKS OF SURGERY, IF NOT SELECTIVE GRINDING IS DONETO ELIMINATE PREMATURE CONTACTS.
MODIFICATION OF THIS INVOLVES CONDYLECTOMY ALONG WITH LATERAL PTERYGOID MYOTOMY.
EMINECTOMY INVOLVES THE REDUCTION OF HEIGHT OF EMINENCE TO ALLOW FREE FORWARD AND BACKWARD MOVEMENTS OF THE CONDYLE.
IT IS IMPORTANT TO REMOVE THE MOST MEDIAL PART OF EMINENCE.
IT DOES NOT INTERFERE WITH THE INTERNAL STRUCTURE OF THE JOINT, SUCCESS RATE IS 100%.

REFERENCES

- NEELIMA ANIL MALIK TEXTBOOK OF ORAL SURGERY.
- S M BALAJI TEXTBOOK OF ORAL AND MAXILLOFACIAL SURGERY.
- PAUL,KEITH,PHILIP,CHURCHILLS 3rd EDITION, ORAL AND MAXILLOFACIAL SURGERY.
- IMAGES FROM NEELIMA MALIK AND S M BALAJI TEXTBOOK OF ORAL SURGERY.
- CARTOON IMAGE FROM GOOGLE.

"Oops! Turn down the power on this lazer thing, will you?"



- MAHATMA GANDHI

THANK YOU