7. Major and minor tip support mechanisms. What is the “tripod” theory?

Tripod theory of Anderson: This theory explains the nasal tip supporting mechanisms. Anatomically, the two alar cartilages form a functional tripod that supports the nasal tip. The right and left lateral crura comprise the two legs of the tripod, while the two conjoined medial crura form the third leg. The apex of the tripod is considered to be the tip of the nose. This tripod is supposed to be the major support of nasal tip. Medial crura are shorter than the lateral crura. Tip rotations can take place either due to increase in the length of medial limb or decrease in the height of lateral limbs. These medial crura are further supported by attachments to superior and inferior portions of nasal septum. The nasal tip tripod is considered to be a dynamic unit suspended and supported by surrounding rigid structures. Other major nasal tip supports include: The attachment of medial crural feet to the caudal end of quadrangular cartilage Scroll-like attachment of the caudal end of upper lateral cartilage to the cephalic margin of the lateral crura

Tardy’s classification of nasal tip support systems: According to Tardy there are three major and six minor support mechanisms of nasal tip.

Tardy’s major support mechanisms include:
Size, shape, strength and resilience of medial and lateral crura
Attachment of medial crural foot plate to the caudal border of quadrangular cartilage
Attachment of upper lateral cartilages (caudal border) to alar cartilages (cephalic border).
The six minor support mechanisms are supposed to augment the major support system.

Tardy’s Minor tip support system includes:
Ligamentous sling spanning the domes of alar cartilages
Dorsal portion of cartilaginous nasal septum
Sesamoid complex extending the support of lateral crura to the pyriform aperture
Attachment of alar cartilage to the overlying skin and musculature
Nasal spine
Membranous portion of nasal septum

This classification of support systems of nasal tip is based on clinical experience rather than anatomical models. According to Tardy the tip recoil mechanism can be used to study the contribution made by these different nasal tip support systems.

Janeke and Wright nasal tip support hypothesis:
This hypothesis proposes that fibrous connection between the upper and lower lateral cartilages play a vital role in the nasal tip support mechanism. This is in addition to the support structures suggested by Tardy. According to Wright this fibrous connection between the upper and lower lateral cartilages play a vital role in determining the nasal tip tripod structure.

14. Discuss the management of saddle nose deformity. Etiologies?
A saddle-nose deformity is most visibly characterized by a loss of nasal dorsal height. Other features commonly observed in patients with significant saddle-nose deformities include: Depression of the middle
vault and dorsum, Loss of nasal tip support and definition, Shortened (vertical) nasal length, Overrotation of the nasal tip, Retrusion of the nasal spine and caudal septum

A saddle-nose deformity may be congenital or acquired. Most saddle-nose deformities are acquired. A common theme in all acquired saddle-nose deformities is a structural compromise of the nasoseptal cartilage leading to decreased dorsal nasal structural support. The most common causes of saddle-nose deformities are traumatic and iatrogenic. Iatrogenic causes include over-resection of septal cartilage and overreduction of a nasal dorsal hump. Medical conditions leading to saddle nose include: Wegener's granulomatosis, relapsing polychondritis, leprosy, syphilis and ectodermal dysplasia, NKtcell midline granuloma. Intranasal cocaine use can also cause saddling.

For patients with no nasal airway obstruction and minor-to-moderate nasal dorsal saddling, onlay grafting techniques can be used. Onlay grafting can be used to augment the dorsum or to camouflage localized areas of depression. Grafts can be placed via endonalasal or external (transcolumellar) rhinoplastic approaches. The precise creation of the subperiosteal pocket can help stabilize the graft placement site. Transcutaneous suture fixation can be used to prevent graft migration. Larger defects and deformities affecting the middle vault or the nasal dorsum require a more structural reconstructive approach. Fundamental to reconstructing the moderate-to-severe saddle nose is:

1. restoring middle vault function
2. reversing any internal valve narrowing, and reinforcing nasal tip and dorsal support mechanisms

The placement of spreader grafts is usually sufficient to address the internal nasal valve and middle vault collapse.

Contraindications to surgical reconstruction include: patients with malignant, chronic, or autoimmune disease conditions; patients who abuse drugs intranasally; and patients who are poor candidates for rhinoplasty in general.

15. Describe intranasal incisions.
Transfixion (or hemitransfixion): Between septum and medial crura of LLC. Transfixion goes through and through, while hemitransfixion only goes through one side
Intercartilaginous – between ULC and LLC
Marginal incision – at the inferior/caudal border of the LLC
Intracartilaginous incision- going through the LLC transnasally
Rim Incision – Nasal rim – do not use!
Killian Incision- unilateral septal incision from posterior-inferior to superior anterior.

16. How do you perform osteotomies? Describe the various incisions used to gain access to the lower lateral cartilage. What are the advantages and disadvantages of each?
Osteotomies:
- the most important deciding factor for choosing the type of osteotomy is how much movement of the lateral wall is required to the narrow the base bony width. This often can be determined pre-operatively.
- Ie: If a great deal of mvmt is necessary then one may need a complete osteotomy
- Two types:
  1) low to high osteotomy followed by digital compression to produce a greenstick fracture
  2) transverse osteotomy followed by a low to low osteotomy which results in continuous osteotomy and complete movement.
- to perform osteotomy
  inject
  pyriform aperture is straddled with a small speculum and a transverse mucosal cut is made when doing a low to low a slightly curved osteotome is placed low on the aperture. An assistant taps on the osteotome at a sequenced pace, and it is driven from low on the pyriform aperture across the frontal process of the maxilla to end high at the nasal bone suture line at the level of the medial canthus. (no need to drive to skull base)
  then using a thumb you would make a transverse fracture across the thin nasal bone extending from the lateral osteotomy into the open roof
When greater movement is required you may do a two-part combined osteotomy. First a transverse percutaneous osteotomy followed by a low to low osteotomy. For this, a vertical stab incision is made just above the medial canthus to the open roof. Next, the low to low lateral osteotomy is done using a straight osteotome. Once the level of the preceding osteotomy is reached, the osteotome is rotated medially forcing the lateral wall medially and achieving maximum movement.

Medial oblique osteotomy: designed to narrow the broad bony dorsum and is coupled with a low-to-low osteotomy.

Curved osteotome is placed on the cephalic end of the open roof and driven downward towards the medial canthus.

Double level:
Designed to reduce the convexity of the lateral wall.
Osteotomy along the inferior border of the nasal bone and a low to low. *** higher osteotomy must be done first.