

# FAT ADHERENCE SYNDROME

ex Sindrome Aderenziale di Johnson

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## Definizione

- FAS is recognized clinically by a progressive permanent restriction of motility thought to result from violation of Tenon's capsule and introduction of orbital fat around the extraocular muscles and sclera.
  - Parks MM. The overacting inferior oblique muscle. *Am J Ophthalmol* 1974;77:787-97.
  - Johnson LV. Adherence syndrome: pseudoparalysis of the lateral or superior rectus muscle. *Arch Ophthalmol* 1950; 44: 870-878

## cause

- Chirurgiche:
  - Obliquo inferiore
  - Episclerale
- Traumi

## clinica

- In caso di chirurgia sull'obliquo inferiore:
  - (un particolare tipo è la «IO adherence syndrome»)
  - Ipotropia maggiore in adduzione
  - Duzioni forzate positive
  - Assenza di alterazioni legate all'obliquo superiore (tipo Sindrome di Brown)
- In caso di chirurgia episclerale:
  - Dipende dal muscolo coinvolto

### The Inferior Oblique Muscle Adherence Syndrome

Barton J. Kushner, MD

**Objective:** To describe the clinical features, etiology, prevention, and treatment of the inferior oblique muscle (IO) adherence syndrome.

**Methods:** This series consists of 12 patients treated for a restrictive hypotropia in which the middle portion of the IO was scarred anteriorly, either into or near the inferior rectus muscle (IR) insertion, after prior surgery.

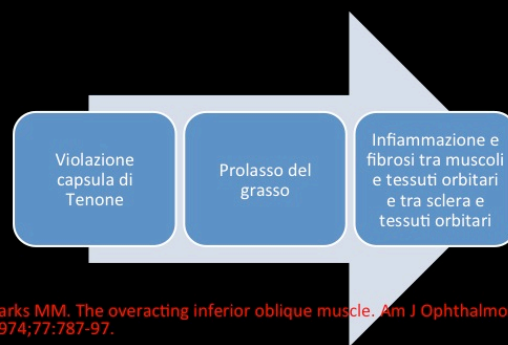
**Results:** Among the 12 patients treated, the mean hypotropia of the affected eye was 18.1 ± 2.2 prism diopters and the mean esotropia was 13.8° ± 3.3°. Causes of the IO adherence syndrome included IR surgery (with

or without prior IO myectomy) and scleral buckling surgery. The syndrome responded well to surgically releasing or resecting the incarcerated IO, combined with ipsilateral IR recession.

**Conclusions:** The IO adherence syndrome is a complication of surgery on the IR or of scleral buckling surgery, which can result in a restrictive hypotropia and esotropia. It can be prevented by paying attention to the anatomic relationship between the IO and IR and can be effectively treated if it occurs.

Arch Ophthalmol. 2007;125(11):1510-1514

## Perché la FAS?



- Parks MM. The overacting inferior oblique muscle. *Am J Ophthalmol* 1974;77:787-97.

## Perché la FAS?

- Confermato da Wright:
  - Presenza di aderenze continue tra muscoli, sclera e grasso orbitario in occhi precedentemente operati per distacco di retina con chirurgia episclerale
- Wright KW. The fat adherence syndrome and strabismus after retina surgery. *Ophthalmology* 1986;93:411-5.
- Parks MM. Discussion of Wright KW. The fat adherence syndrome and strabismus after retina surgery. *Ophthalmology* 1986;93:415.

# Ma....

- 1° studio:
  - un modello di FAS sui conigli e no coinvolgimento di grasso nella ferita nel 75% dei casi
- 2° studio:
  - Un modello di FAS nei maiali con grasso extraconale esposto e traumatizzato ma nessuna evidenza di FAS

- Brooks SE, Ribeiro GB, Archer SM, Elnor VM, Del Monte MA. Fat adherence syndrome treated with intraoperative mitomycin-C: a rabbit model. *J Pediatr Ophthalmol Strabismus* 1996;33:21-7.
- Brooks SE, Yu JC, Preston D, Johnson MH. Restricted ocular motility after orbital trauma-studies with an animal model. *J AAPOS* 1998;2:246-52.

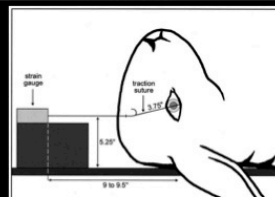
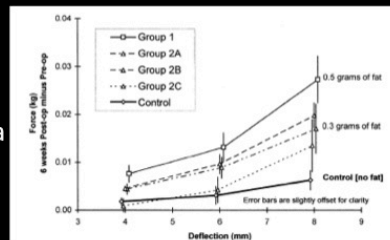
## Fat Adherence Syndrome: An Animal Model

Natalie C. Kerr, MD

**Background:** Fat adherence syndrome (FAS) is a permanent restrictive strabismus that can occur after periocular surgery or trauma. The pathophysiology is poorly characterized. **Methods:** Under varying conditions, fat autografts were secured with dissolvable sutures between the inferior rectus and the periosteum of the inferior orbital rim in both eyes of 15 New Zealand white rabbits. Sutures without fat autografts were placed in both eyes of three control rabbits. The force required to move the eyeball superiorly 4, 6, or 8 mm was measured with a digital strain gauge preoperatively and 6 weeks after surgery. Twelve of the 15 rabbits with autografts were then sacrificed, and exenteration specimens were taken. The three remaining rabbits (six eyes) were observed for 6 months after placement of fat autografts. **Results:** Analysis of variance allowed rejection of the null hypothesis that there was no difference among the postsurgical groups for all deflection points when 6 weeks postoperative was compared to baseline (preoperative) measurements ( $P \leq 0.05$ ). Regression analyses showed that stiffness at each deflection was dependent on the amount of fat placed in the orbit. In three rabbits observed for 6 months, restriction tended to be stable over the 6-month observation period and was not alleviated by lysis of adhesions or removal of the fat grafts. **Conclusion:** A fat autograft introduced into an extraocular wound in rabbits will produce a permanent restrictive strabismus. This model may prove useful in the study of FAS. (*J AAPOS* 2004;8:349-356)

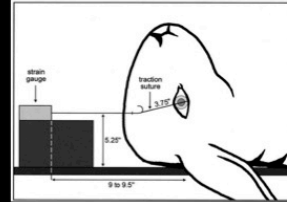
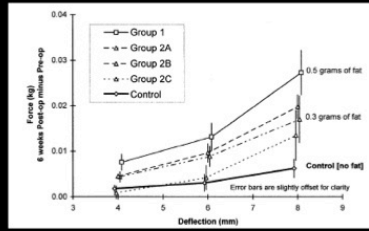
## FAS: animal model

- Gruppo 1: 0,5g
- Gruppo 2: 0,3g
- A: no altra chirurgia
- B: sangue autologo
- C: retto inferiore
- Gruppo 3: controllo
- solo retto inferiore



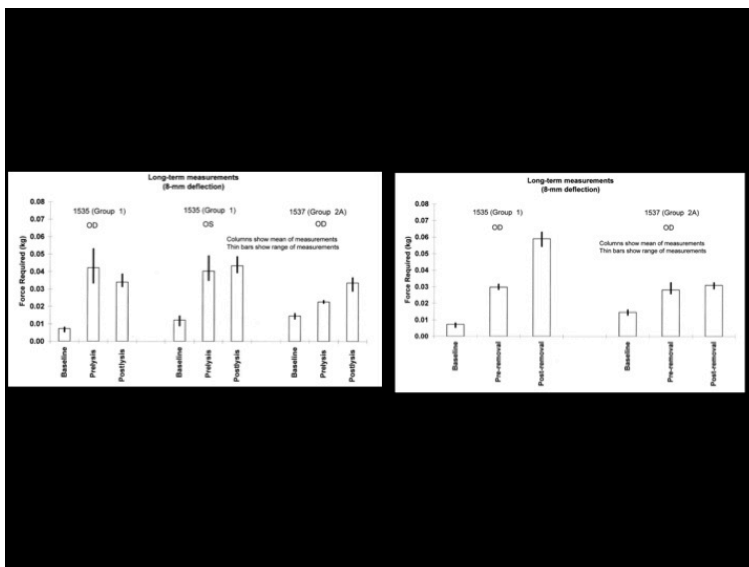
# Conclusions

- Introduzione di grasso produce restrizioni della motilità oculare simili a quelle viste clinicamente nell'uomo, l'associazione di sangue autologo o chirurgia associata non aumenta significativamente le anomalie della motilità indicando che il grasso di per sé può determinare una FAS
- La vicinanza dell'IO al grasso orbitario aumenta il rischio di FAS in caso di chirurgia



# Cosa fare?

- Lisi delle aderenze e chiusura della capsula di Tenone?



## trattamento

- L'infiammazione prodotta dal grasso determina una perdita di elasticità dei tessuti e dei muscoli che rende difficile il recupero funzionale anche dopo chirurgia

### – Tentativi con membrana amniotica:

- Yamada M et al. Fat adherence syndrome after retinal surgery treated with amniotic membrane transplantation. *Am J Ophthalmol.* 2001 Aug;132(2):280-2
- Strube YN et al. Amniotic membrane transplantation for restrictive strabismus. *Ophthalmology* 2011

## trattamento

- L'unico vero trattamento rimane la prevenzione tentando di preservare l'integrità della capsula di Tenone durante le manovre chirurgiche