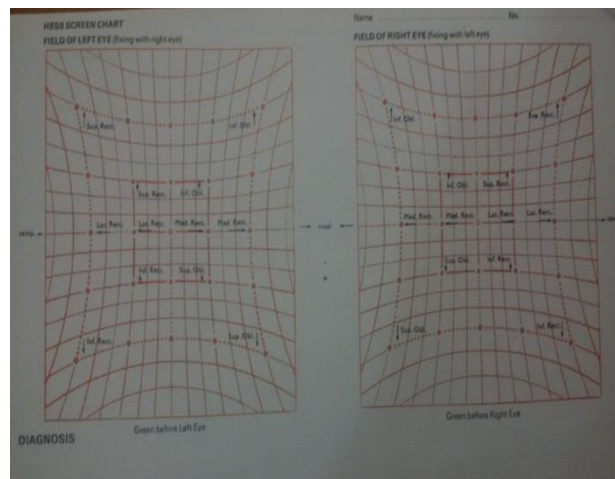


*Research Article***Evaluation of range of motility after horizontal Strabismus surgery using Lees screen test****Ahmed M Sabry, Mohamed F. Khalil, Sahar T. Abdelrazik, and Mahmoud R. Abdelsamei**

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Introduction

Lees screen is a method to map out ocular deviations which developed by Dr V.T. Lees which depends on using of two opalescent glass screens at right angle to each others bisected by two side plane mirror (Roussel, 1952).

Key words:**Lees screen, Hess chart, Hess score.****Figure (1) lees screen****figure (2) Hess chart**

Concomitant strabismus surgery is done by working on various extraocular muscles by either weakening (recession) or strengthening (resection or tucking) procedure (Rosenbaum and Santiago, 1999). Healing by fibrosis is the nature of various human tissues including extraocular muscles, so that the question "What is the effect of strabismus surgery on range of motility of extraocular muscles?" is born.

Range of extraocular muscle motility is plotted on specific Hess charts. A new scoring system for Hess charts is described. Scores for both horizontal and vertical deviations are calculated from the displacement of individual points on Hess

chart using weighting factors for the center, inner and outer zone. That allows for interpretation and objective comparison between different charts (Aylward et al., 1992)

Patients and Methods

Twenty four patients, 16 females and 8 males, age range between 10 - 40 years old, had concomitant horizontal strabismus with exclusion of cases with Restrictive, paralytic strabismus, Vertical strabismus, History of previous strabismus surgery or ocular trauma, Patients with any degree of preoperative incomitance detected by preoperative Lees screen test, Mental disability and / or poor vision in one or both

eyes as they were unable to perform Lees screen test.

All cases are subjected to full preoperative evaluation, Lees screen test and calculation of Hess screen score have been performed preoperatively and repeated postoperatively in a schedule of one week, one month, and three months, For comparative purposes, eso or exo deviation of charts has been corrected (outward or inward decentration of charts has been corrected).

Results

In the current study the questions to be answered were:

Q1) Is there any change in ocular motility of the medial and lateral recti following different surgical procedures (resection, recession and plication)?

There was no change in the vertical motility of the eye in all patients of the study but, Regar-

ding the horizontal ocular motility there was underaction of movement in 53.6% of the operated muscles (30 out of 56) at the end of the 1st postoperative week.

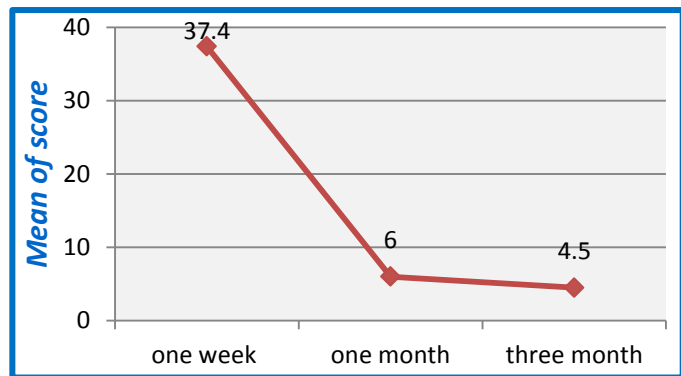
Q2) For how long does that under-action persist?

By the **1st postoperative week:** the score of underaction of eye motility ranged between 12.5 and 90 with a mean of 37.4±18.3

By the **1st month:** the underaction disappeared in all cases except in cases having muscle plication where the underaction was of less degree but persisted after **the 3rd month.** **Overaction** was only reported when plication was performed in the medial rectus and it was reported in the contralateral medial and lateral rectus muscles.

A chart shows mean of follow up scores at one week, one month and three month among the studied group.

Variable	Range	Mean ±SD
Score at 1 week	12.5-90	37.4±18.3
Score at 1 month	0-43	6±12.9
Score at 3 month	0-28	4.5±9.4
P-value from 1 week	<0.001	



Q3) what are the risk factors for the development of postoperative underaction?

Age, sex and muscle operated whether lateral or medial rectus **were not risk factors** for the occurrence of this underaction

Number of muscles operated was a risk factor as no underaction was recorded in cases of 3 or 4 muscle surgery and

underaction was only restricted to cases with operation only on one or two muscles.

Plication procedure was a risk factor for the development of underaction of ocular motility

Q4) what are the factors that can predict the amount of postoperative limitation?

By analysis of the group of patients who reported postoperative underaction, we found that:

1) **Age and sex** have no role in predicting the amount of postoperative underaction of ocular motility.

2) **Regarding the number of muscle operated:**

The mean score of underaction in patients underwent two muscle surgery was 39 which was **double** the score of underaction in patients underwent only one muscle surgery (mean = 15.5) and the difference was statistically significant (p=0.041).

In non-plication subgroup, the mean score of under action of the medial rectus at 1st week is 35.6 which was greater than that of

lateral rectus (33.7) but the difference still statistically insignificant (p=0.738)

In plication subgroup: at the 1st week, the mean score of underaction of the lateral rectus was 54.1 which was greater than that of the medial rectus (28.6) but the difference was not statistically significant (p=0.085).

By the 1st month and 3rd month the mean score of underaction of the lateral rectus was (30) and (22.5) respectively while there was no under action recorded in the medial rectus subgroup

Score of under action of the medial and lateral rectus in non-plication group at first postoperative week

One week score	Medial rectus N=10	Lateral rectus N=8	P-value
Mean ±SD	35.6±13.1	33.7±8.9	0.738

Q5) how can we explain the cause of that underaction?

In non plication group: the underaction was temporary and disappears by the first month.

There is 2 possible causes:

- 1) Mechanical theory as a result of ocular trauma and tissue oedema.
- 2) The other possible theory is neurological. We have “**myotendinous cylinders**” at the myotendinous junction of EOM which provide afferent information about eye muscle proprioception contributed to long term recalibration of the motor system.

So that in cases of resection a considerable amount of these receptors was removed within the resected part and **in recession** the tension within recessed muscle is reduced so the afferent output from the myotendinous cylinders would consequently reduce in both resection and recession so the information sent to the oculomotor control centre would cause disturbance of the efferent nerve discharge

and cause limited ocular motility in the direction of action of the operated muscle.

Later on, adaptation occurs and finally the new efferent discharge would be sufficient to move the operated muscle to its full range of motility. **In cases of 3 or 4 muscle surgery:** this adaptation occurs more rapid and recovery takes few days so these patients did not develop underaction by the first postoperative week.

In plication group : also mechanical and neurological theories can explain underaction in ocular motility that occurs as plication is considered functional resection and a part of muscle “is out of service” so that the myotendinous afferent discharge from the muscle is altered.

Conclusion

In the current study, postoperative underaction was reported in more than half of the patients with concomitant horizontal

strabismus who underwent resection, recession and plication.

The reported underaction at the 1st postoperative week disappeared by the 1st postoperative month in all patients except those where plication procedure was performed.

The risk factors for the development of postoperative underaction of ocular motility were plication procedure and operation of only one or two muscles

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