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# Electromyographic Studies

Spinal Flexor and Extensor  
Muscles

by

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# Introduction

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- ◉ It has been well established that a healthy spine depends in part to the stability and balance of the flexor and extensor muscles of the spine.
- ◉ There are many exercises that activate the spinal flexor muscles but the question becomes to which exercise (s) optimize the spinal flexor muscles recruitment with minimal compressive load to the lumbar spine.

# Early Studies.....50',70'

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- Comparison of different abdominal exercises using EMG.
- Exercises included full sit-ups ( feet held or not), trunk curl ( feet held or not), sit-up with a twist, double leg lift.
- Rectus abdominal ( upper /lower) and obliques activity.
- Speed of movement.

# Results.....

- ◌ Rectus abdominis activity higher in the partial sit up ( upper) versus full sit up ( bent or straight knee).
- ◌ Fast supine full sit-up ( straight legs), supported offered the greatest activity duration for the rectus abdominis and external oblique.

# Recent Studies.....mid 90's

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- ⌚ Comparison of different exercises and spinal flexor muscles activity.
- ⌚ Implications of cervical and pelvic alignment.
- ⌚ Abdominal exercises and compressive load to the lumbar spine.

# Results.....

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- In order to increase activity of the abdominal muscles without jeopardizing the lumbar spine one may need to keep in mind the following when performing the exercises.....

# Results cont.....

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- ⦿ Pelvic stabilization.....
- ⦿ partial sit-ups with flexed and/or slightly extended knees.
- ⦿ Full sit ups (flexed or straight knees) with the highest compression to the lumbar area.
- ⦿ Variation of exercises.