

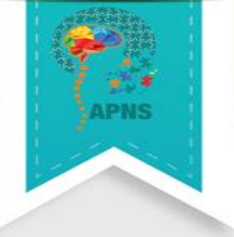
DOES REMOVAL OF HYPERTROPHIC POSTERIOR LONGITUDINAL LIGAMENT ALONG WITH CERVICAL DISCECTOMY AFFECT SURGICAL OUTCOME IN ANTERIOR CERVICAL DISCECTOMY AND FUSION?

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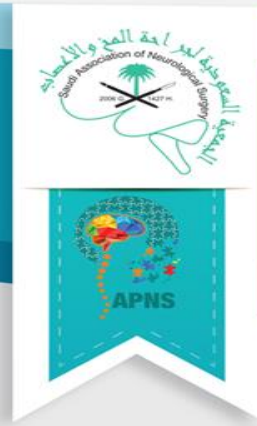
OBJECTIVES



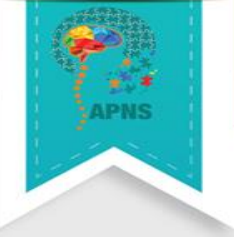
- Does hypertrophy of posterior longitudinal ligament (HPLL) significantly contribute to cervical myelopathy, when associated with cervical disc herniation (CDH)?

OPLL

- Ossification of Posterior Longitudinal Ligament (OPLL)
- Enthesopathy
- Conditions that result in progressive inflammation of the tendons and ligaments of the axial or appendicular skeleton (or both) and **subsequent degeneration and calcification.**



HPLL

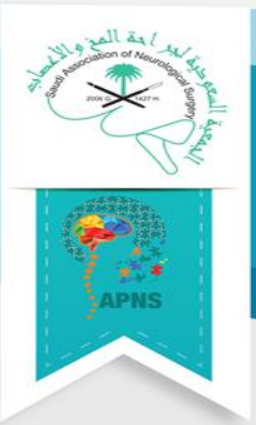


- The posterior longitudinal ligament is normally 1 or 2 mm thick
- Dynamic process
- Hypertrophy is an initial stage of the degenerative process towards OPLL

HPLL



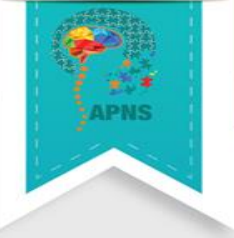
OPLL



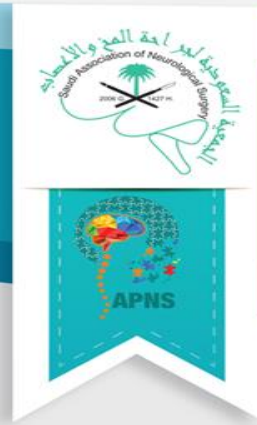
- Posterior longitudinal ligament undergoes **degenerative changes** with subsequent tissue **hyperplasia**, fibrocartilaginous cell proliferation, and subsequent **ligamentous hypertrophy**.
- Endochondral bone growth leads to collagen deposition and mineralization and the formation of **punctate ossification centers**.
- As the ossification centers coalesce, mature lamellar bone with haversian canals results and leads to active bone marrow production and **frank ossification**.

OBJECTIVES

- A retrospective analysis was done to review the surgical outcome in order to compare the effects of removal of hypertrophied posterior longitudinal ligament (PLL) versus its' preservation during ACDF in association with CDH.



MATERIALS & METHODS

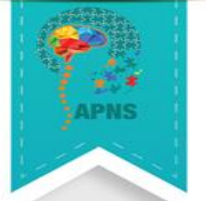


STUDY SAMPLE : 56 patients presenting with CDH and associated HPLL to a single institution (National Hospital of Sri Lanka)

STUDY PERIOD : 4 years period from 1st October, 2012 to 30th September, 2016.

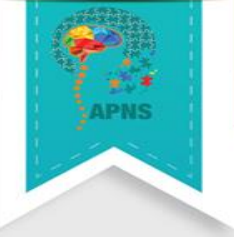
STUDY DESIGN : Retrospective analytical study

MATERIALS & METHODS



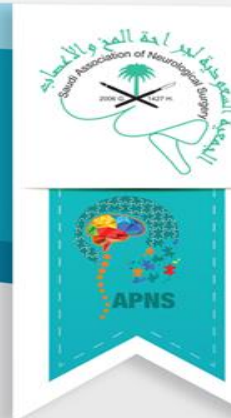
- Out of 451 patients who presented to the neurosurgical clinic at NHSL with features of cervical myelopathy or radiculopathy, 81 selected who presented with CDH and associated HPLL.
- Patients with segmental type HPLL was excluded. (25)
- Patients who had more than two level disc protrusions and who had undergone previous cervical spine surgery were excluded.
- Patients with disc **herniations and spondylosis/ligamentum flavum hypertrophy** - if spondylosis was severe and more predominant - excluded

MATERIALS & METHODS






- **All the patients**
- Underwent CT and MRI scans to confirm the presence of CDH and HPLL.
- HPLL confirmed by MRI
- CT and lateral X-ray of cervical spine done to exclude OPLL.
- Liaison with radiologist

MATERIALS & METHODS



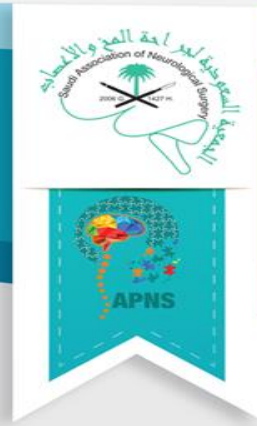
All of them were evaluated on presentation with the Japanese Orthopaedic Association (JOA) score in order to categorize them according to the severity of symptoms

Rationale  More symptoms  More severity  need more decompression

Compression \propto disc + HPLL

Removal or preservation of PLL was decided upon the severity of symptoms where preservation done for JOA score of 12-15 (grade 1) , and its excision performed when JOA was below 12 (grade 2/3)

MATERIALS & METHODS



All the patients were treated by a single/two level anterior cervical discectomy and fusion (ACDF) with cages performed by a single surgeon.

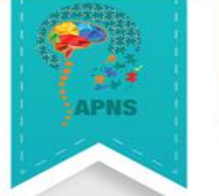
Surgical outcome was evaluated at the end of 6 months according to Odom's criteria.

RESULTS

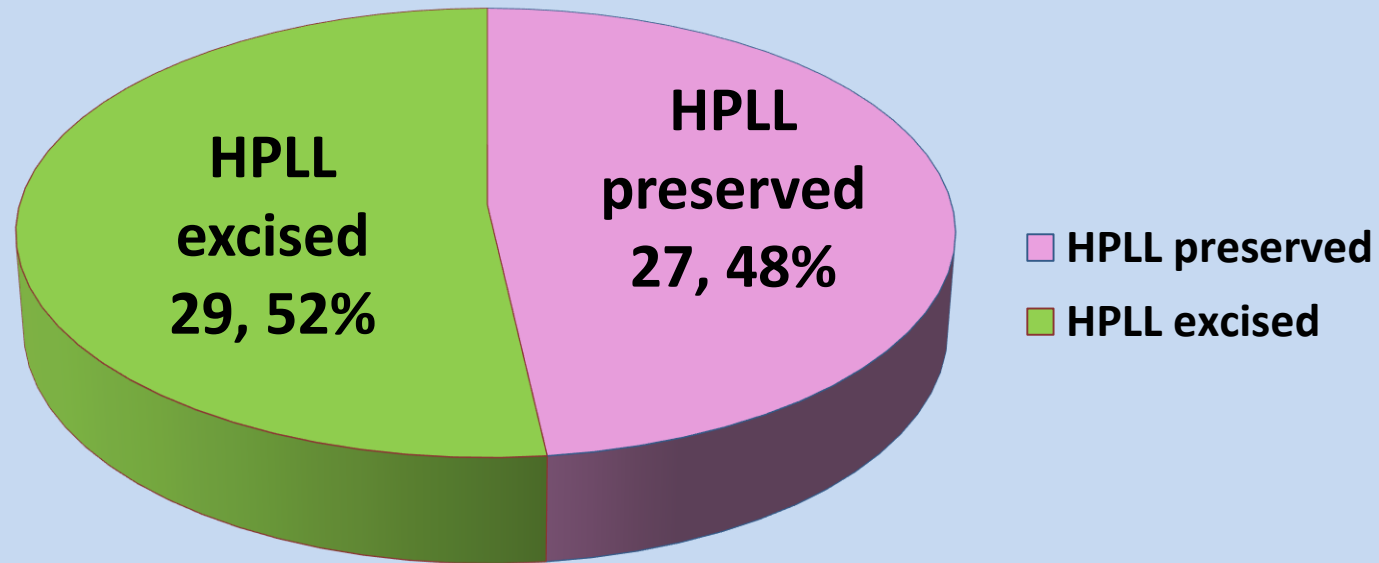


- 36 males and 20 females
- PLL removed in 29. (51.2%)
- PLL preserved in 27. (49.8%)
- 64.3% single level ACDF (36/56)
- 35.7% two level ACDF (20/56)
- Most common variety of HPLL → continuous (54%) →
mixed (30%) → localized (16%)

RESULTS

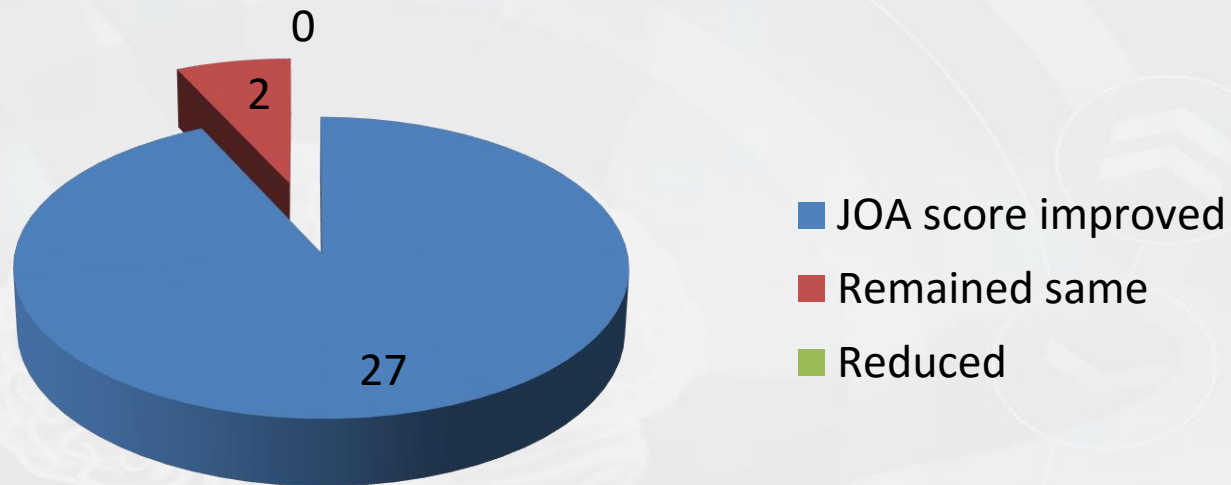


HPLL PRESERVED/EXCISED



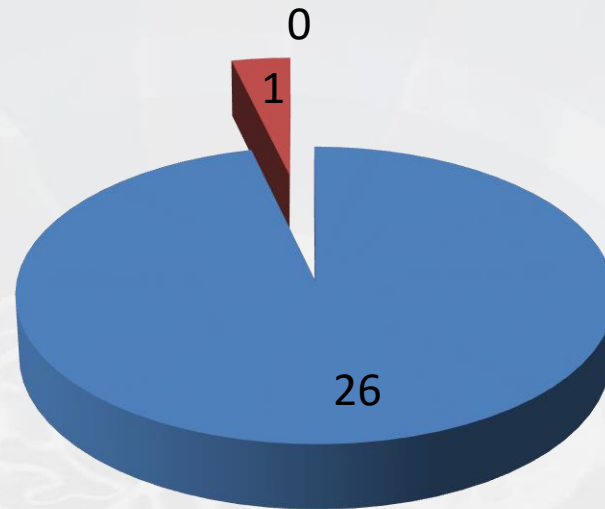
JOA SCORE

- JOA score in PLL excised group



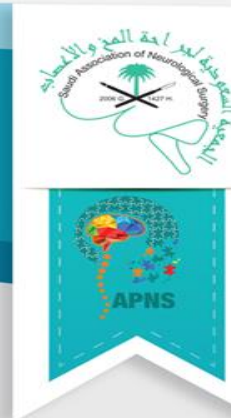
JOA SCORE

- JOA score in PLL preserved group

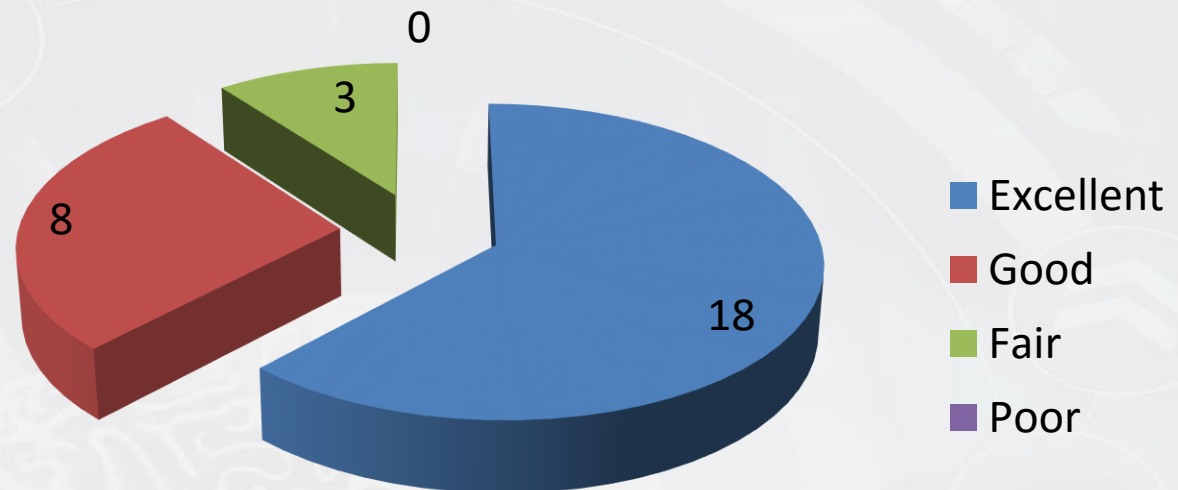


- JOA score improved
- Remained same
- Score reduced

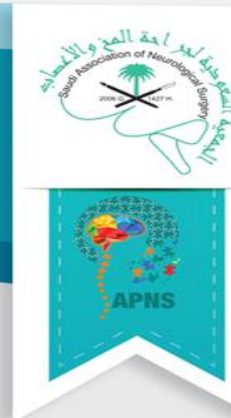
ODOMS CRITERIA



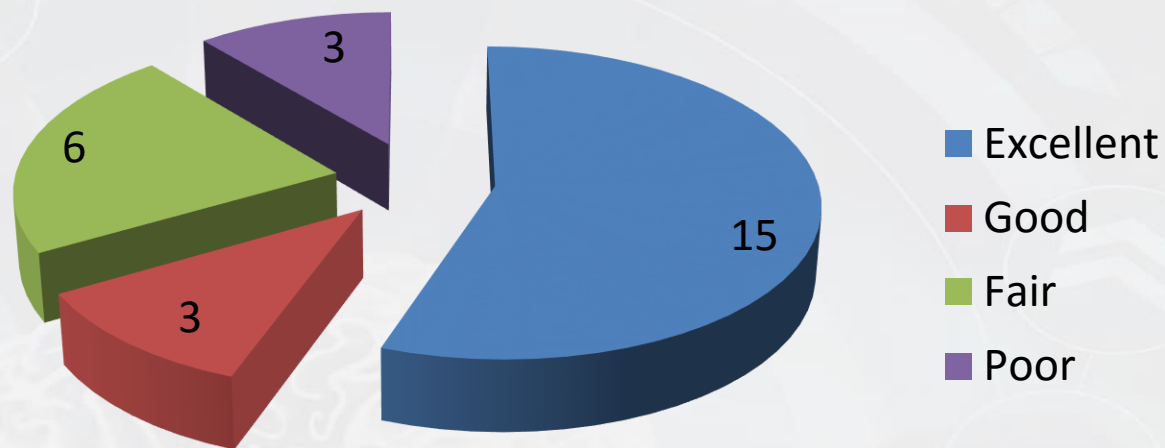
- PLL excised group



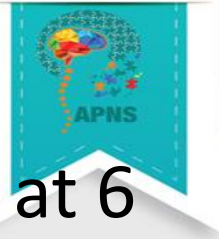
ODOMS CRITERIA



- PLL preserved group



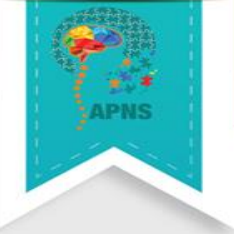
OUTCOME



- PLL excised group – **26/29 (89.6%) excellent or good outcome** at 6 months according to Odoms criteria.
- PLL preserved group – **18/27 (74.1%) excellent or good prognosis** at 6 months.
- Patients who didn't have excellent/good outcomes in PLL excised group → All continuous type.
- In PLL preserved group who didn't have similar outcomes → 73% continuous and 27% mixed type HPLL.
- The difference in outcome was statistically **significant at a P value of 0.036 and OR of 4.33 with CI of 1.03-18.23.**

CONCLUSION

Excision of HPLL has a significant effect on surgical outcome when performed along with cervical discectomy during single/ two level ACDF in selected patients.



REFERENCES

- Youmans Neurological Surgery Expert Consult) H. Richard Winn MD-Youmans Neurological Surgery, 4-Volume Set_ Expert Consult - Online and Print, 6e-Saunders (2011)
- Schmidek and Sweet's Operative Neurosurgical Techniques (2012)
- S. S. Rengachary, R. H. Wilkins-Neurosurgical Operative Atlas -The American Association of Neurological Surgeons (1999)
- Anne G. Osborn, Karen L. Salzman, A. James Barkovich-Diagnostic Imaging_ Brain-Lippincott Williams & Wilkins (Amirsys) (2010)
- Tsuyama N. Ossification of the posterior longitudinal ligament of the spine. Clin Orthop Relat Res. 1984
- Wang MY, Thambuswamy M. Ossification of the posterior longitudinal ligament in non-Asians: demographic, clinical, and radiographic findings in 43 patients. Neurosurg Focus. 2011]
- Ehara S, Shimamura T, Nakamura R, Yamazaki K. Paravertebral ligamentous ossification: DISH, OPLL and OLF. Eur J Radiol. 1998
- Matsunaga S, Sakou T, Taketomi E, Komiya S. Clinical course of patients with ossification of the posterior longitudinal ligament: a minimum 10-year cohort study. J Neurosurg. 2004;100(3 Suppl Spine)
- Chiba K, Kato Y, Tsuzuki N, et al. Computer-assisted measurement of the size of ossification in patients with ossification of the posterior longitudinal ligament in the cervical spine. J Orthop Sci. 2005
- Chang H, Kong CG, Won HY, Kim JH, Park JB. Inter- and intra-observer variability of a cervical OPLL classification using reconstructed CT images. Clin Orthop Surg
- Cardoso MJ, Koski TR, Ganju A, Liu JC. Approach-related complications after decompression for cervical ossification of the posterior longitudinal ligament. Neurosurg Focus. 2011
- Sugrue PA, McClendon J, Jr, Halpin RJ, Liu JC, Koski TR, Ganju A. Surgical management of cervical ossification of the posterior longitudinal ligament: natural history and the role of surgical decompression and stabilization. Neurosurg Focus. 2011
- Koyanagi I, Iwasaki Y, Hida K, Imamura H, Abe H. Magnetic resonance imaging findings in ossification of the posterior longitudinal ligament of the cervical spine. J Neurosurg. 1998
- Smith ZA, Buchanan CC, Raphael D, Khoo LT. Ossification of the posterior longitudinal ligament: pathogenesis, management, and current surgical approaches. A review. Neurosurg Focus. 2011
- Song KJ, Choi BW, Park HJ. Anterior cervical decompression and fusion for the treatment of cervical spondylotic myelopathy. J Korean Orthop Assoc. 2002

