Les hernies discales lombaires

Rachialgies en pédiatrie Séminaire SOFOP Bordeaux 2024

Timothée de Saint-Denis

Carnet opératoire

Exercice neurochirurgical pédiatrique exclusif depuis novembre 2015
Centré sur les pathologies rachidiennes et médullaires

1 patient opéré en 2016: 16 ans, hernie discale lombaire, Sciatalgie hyperalgique ,
ATCD: craniosténose, surpoids, Scheuerman
2 infiltrations radioguidées
Chirurgie de décompression mini-invasive par écarteur tubulaire sous microscopie

Suivi 2 ans, pas de récidive des douleurs

Consultation pour hernie discale :
4-6 patients /an, 3 patients adressés en infiltration

Consultation avec diagnostic de hernie discale:
12-15 patients par an

Rechercher une maladie rare

hernie discale

Chercher

(*) Champ obligatoire

- Nom de maladie
- OMIM
- Nom de gène
- Code ORPHA
- CIM-10

Autre(s) option(s) de recherche

1 Résultat(s)

ORPHA:101005 (Pathologie) Paraplégie spastique autosomique récessive type 25

Synonyme(s) : **Syndrome autosomique récessive de paraplégie spastique-hernie discale**

orphanet

Rechercher une maladie rare

hernie discale lombaire

Chercher

(*) Champ obligatoire

- (•) Nom de maladie
- ( ) OMIM
- ( ) Nom de gène
- ( ) Code ORPHA
- ( ) CIM-10

Autre(s) option(s) de recherche

⚠ Pas de résultat

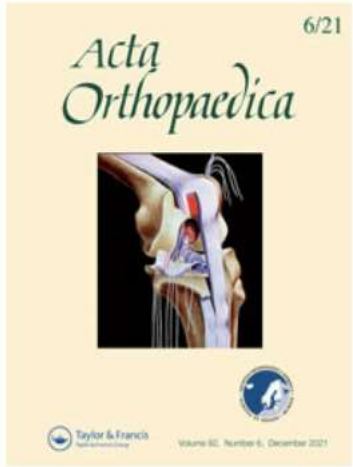
1er cas dans la littérature

FROM LUDVIKA HOSPITAL. HEAD: THE AUTHOR

HERNIATED NUCLEUS PULPOSUS IN A CHILD OF TWELVE YEARS

BY

HERMAN WAHREN



Tiendrebeogo/Zabsonre *et al. Pediatric Rheumatology* (2024) 22:1
https://doi.org/10.1186/s12969-023-00942-4

Pediatric Rheumatology

2024

CASE REPORT **Open Access**

Pediatrics severe low back pain by disc herniation: an uncommon entity

Wendlassida Joelle Stéphanie Tiendrebeogo/Zabsonre[1*], Denlewende Sylvain Zabsonre[2], Fulgence Kabore[1], Abdoulaye Sanou[2], Yakouba Haro[2], Inoussa Zoungrana[2] and Dieu-Donné Ouedraogo[1]

- Quelle est l’épidémiologie dans les âges pédiatriques ?

- Existe-t-il des facteurs de risque intrinsèques et environnementaux ?

- Les symptômes sont-ils assez caractéristiques pour ne pas méconnaitre le diagnostic ?

- Les innovation chirurgicales ont-elles changé la donne pour la chirurgie pédiatrique ?

-Le devenir à long terme d’un organisme jeune et en croissance est il connu ?

Diagnostic de hernie discale

51 % ⟷ 18 %

Population pédiatrique < 18ans

Acta Orthop. Belg., 2022, 88, 275-283

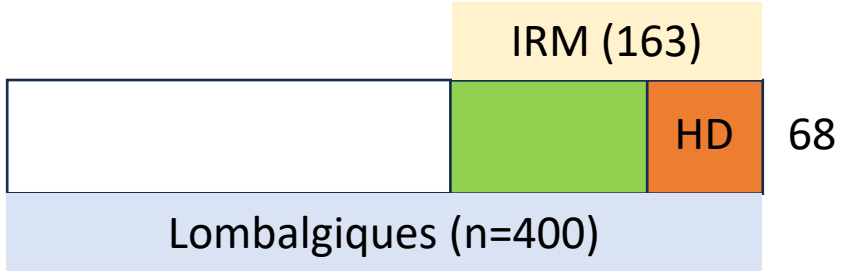
ORIGINAL STUDY

doi.org/ 10.52628/88.2.8528

The effect of transitional vertebrae and spina bifida occulta on disc herniation, disc degeneration, and end-plate changes in pediatric patients with low back pain

Ozge Gulsum İLERİ, Fatma Esra BAHADIR ULGER, Ilknur AKTAS

From the Fatih Sultan Mehmet Training and Research Hospital, Istanbul, Turkey



HEALTH SERVICES RESEARCH

Cumulative Incidence of Lumbar Disc Diseases Leading to Hospitalization up to the Age of 28 Years

Zitting, Paavo MD*; Rantakallio, Paula MD, PhD*; Vanharanta, Heikki MD, PhD†

Author Information

Spine 23(21):p 2337-2343, November 1, 1998.

étude longitudinale observationnelle finlandaise
(12058 bébés nés en 1966)
recours à hospitalisation pour lombalgies :
incidence cumulée des HDL **4/10000 à l'âge pédiatrique**

Review > J Am Acad Orthop Surg. 2011 Nov;19(11):649-56.

doi: 10.5435/00124635-201111000-00001.

Pediatric disk herniation

William F Lavelle [1], Aaron Bianco, Robert Mason, Randal R Betz, Stephen A Albanese

Affiliations + expand

PMID: 22052641 DOI: 10.5435/00124635-201111000-00001

Incidence estimée 1-2% à l'âge pédiatrique
vs > 40% population adulte

< 12 ans : 2,5% des HDL des séries

Raghu et al., 2019

Table 1
Surgical LDH case reports*.

Year	Authors	Age	Sex	Features	Surgical outcome
2008	Benifla et al. [13]	1 year	M	Youngest ever reported	Resolution
2011	Cahill et al. [14]	18 months	F	Following a fall	Resolution
2014	Alexiou et al. [15]	8 years	M	Cystic fibrosis	Resolution
2010	Jiang and Jiang [16]	12 years	M	Extreme lateral herniation	Resolution
2011	Chang et al. [17]	12 years	M	Cauda equina syndrome	Resolution
2015	Yuceer and Arda [18]	12 years	F	Somersault	Resolution
2016	Farrokhi et al. [19]	13 years	M	Ring apophysis fracture	Resolution
		14 years	M	Ring apophysis fracture	Resolution
2017	Kadam et al. [20]	15 years	M	Ring apophysis fracture (fall)	Resolution
2013	Fridley et al. [21]	16 years	F	US-guided epidural blood patch	Resolution
		17 years	F	US-guided epidural blood patch	Resolution
2015	Grudkova et al. [22]	17 years	F	Femoral head osteoid osteoma	No improvement (hip pain)
2012	Hsu et al. [23]	14 years	M	Painful scoliosis	Resolution
		14 years	M	Painful scoliosis	Resolution
		16 years	F	Painful scoliosis	Resolution
		21 years	M	Painful scoliosis	Resolution

* Reports of 4 paediatric cases or less.

The largest recent series measuring this found 51% of patients 17–18 years of age, 46.5% 13–16 years and 2.5% 12 years or younger [4]. To our knowledge, there have been only 8 published surgical cases of children below 10 years old in the last 30 years [13–15,41–44]. Recent

Niveaux, Propriétés mécaniques

Acta Orthop. Belg., 2022, 88, 275-283

ORIGINAL STUDY

doi.org/ 10.52628/88.2.8528

The effect of transitional vertebrae and spina bifida occulta on disc herniation, disc degeneration, and end-plate changes in pediatric patients with low back pain

Ozge Gulsum İLLEEZ, Fatma Esra BAHADIR ULGER, Ilknur AKTAS

From the Fatih Sultan Mehmet Training and Research Hospital, Istanbul, Turkey

		n	%
Type of LDH(n=163)	**None**	12	7.4
	Bulging	83	50.9
	Protrusion	66	40.5
	Extrusion	2	1.2
Level of LDH(n=68)	**L4-5**	18	26.5
	L5-S1	33	45.8
	L4-5, L5-S1	17	25.0

Surgical management of lumbar disc herniation in children and adolescents

Ashley Laurence Bharat Raghu[a,c,*], Anthony Wiggins[b], Jothy Kandasamy[c,d]

[a] *Oxford Functional Neurosurgery, Nuffield Department of Surgical Sciences, University of Oxford, Oxford, OX3 9DU, United Kingdom*
[b] *Department of Clinical Neurosciences, NHS Lothian, Edinburgh, EH4 2XU, United Kingdom*
[c] *Edinburgh Medical School, University of Edinburgh, Edinburgh, EH16 4TJ, United Kingdom*
[d] *Department of Paediatric Clinical Neurosciences, Royal Hospital for Sick Children, NHS Lothian, Edinburgh, EH9 1LF, United Kingdom*

1094 cas opérés
52% L4/L5
41% L5-S1

Review > J Am Acad Orthop Surg. 2011 Nov;19(11):649-56.
doi: 10.5435/00124635-201111000-00001.

Pediatric disk herniation

William F Lavelle [1], Aaron Bianco, Robert Mason, Randal R Betz, Stephen A Albanese

Affiliations + expand

PMID: 22052641 DOI: 10.5435/00124635-201111000-00001

28% avec fracture du listel marginal

HORS-SUJET
Cf Pr Ph. VIOLAS

> Pediatr Neurosurg. 2013;49(1):16-20. doi: 10.1159/000355127. Epub 2013 Oct 30.

Ring apophysis fracture in pediatric lumbar disc herniation: a common entity

Ash Singhal [1], Anish Mitra, Doug Cochrane, Paul Steinbok

Affiliations + expand

PMID: 24192523 DOI: 10.1159/000355127

Facteurs de risque

Traumatique +++ 30-60% cas

(*Lei DANG et al. 2010*)

Travail: port de charge (construction,agriculture) :compression axiale
Sport: compression axiale hyperflexion-hyperextension
Chute

(*Martinez-Lage et al., 2021*)

Génétiques:
récepteur de la Vitamine D, collagènes (type I, IX, XI), composant des protéoglycanes (Aggrecan), métallo protéinase (MMMP-3, 2), interleukines (1, 6)

Zielinska et al., 2021

Hérédité : 13-57% adolescents avec HDL avec ATCD 1er degré

(*Lei DANG et al. 2010*)

Mélange de génétique et d'environnemental

Facteurs de risque morphologiques et anatomiques

Taille :
RR 2,3 hommes >180cm, RR 3,7 femmes >170cm vs même pomulation de 10cm de moins

(*Heliövaraa et al., 1987*)

Obésité : tronculaire ++ (discopathie, hypertrophie ligamentaire, hernie discale, sténose)
analyse radiologique quantitative obésité-hernie discale dignificative

(Rodriguez-Martinez et al., 2016)

Spina bifida occulta sans anomalie médullaire et les anomalies transitionnelles lombosacrées : pas de lien signficatif

(Illeez et al., 2022)

anomalies vertébrales (au sens plus large comprenant + scolioses ils sont couramment considérés comme facteurs favorisants mais sans données quantitatives disponibles.

(*Lei DANG et al. 2010*)

Facteurs de risque : âge

Journal of Clinical Medicine

MDPI

Review

Risk Factors of Intervertebral Disc Pathology—A Point of View Formerly and Today—A Review

Nicol Zielinska [1], Michał Podgórski [2], Robert Haładaj [3], Michał Polguj [3] and Łukasz Olewnik [1,*]

Table 7. Frequency distribution of patients with lumbar disc herniation according to age group in 2008, 2012, and 2016

Age Group	2008	2012	2016
0–9	0.01	0.01	0.01
10–19	1.37	1.34	1.07
20–29	7.18	6.34	5.78
30–39	12.61	12.84	11.54
40–49	20.68	18.35	16.61
50–59	22.16	24.34	23.44
60–69	19.98	17.86	19.84
70–79	13.04	14.70	15.48
≥80	2.97	4.22	6.23

Présentation clinique

Lombalgie mécanique
Apparition aigue, aggrévée par effort et antéflexion
+/- radiculalgie, souvent unilatérale,
+/- paresthésies, dysesthésies …

Idem adultes

Lasègue : meilleure sensibilité (90 % cas de hernies discales pédiatriques *Lei Dang et al. 2010*)
Hypothèse : tension radiculaire plus importante)

Déficit neurologique: exceptionnel

Martinez-Lage et al. , 1997

Présentation clinique : très jeunes

Symptômes variablement typique
Difficultés selon capacités d'explicitations

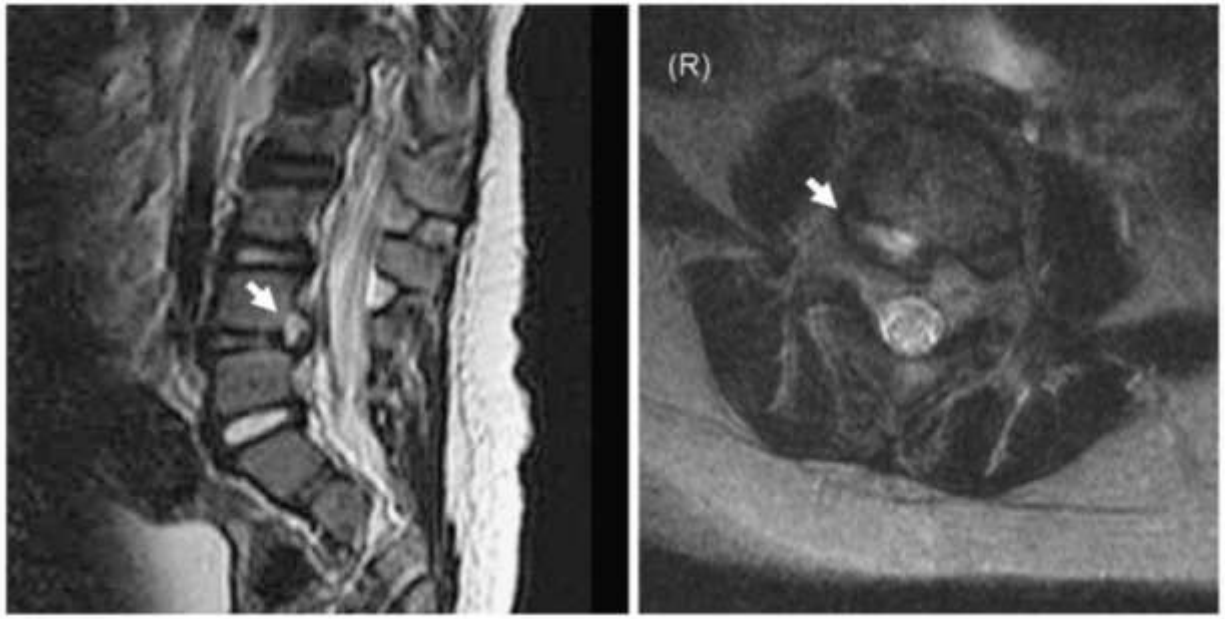
Tous petits : (cas 13, 18, 27 mois)
Refus de marche /position assise, Irritabilité

Childs Nerv Syst (2011) 27:687–691
DOI 10.1007/s00381-010-1369-6

CASE-BASED UPDATE

Paediatric lumbar disc herniation in the very young: A case-based update

Julian Cahill · Geoffrey Frost · Guirish A. Solanki



18 mois, chute de 60 cm d'un lit sur le sol

Marche ou tenue assise impossible

Exacerbation de la douleur à l'extension de jambe

Neuro et bio normales

Echec traitement conservateur
Chirurgie : micro, laminoplastie

RAD 48h post op

Diagnostics différentiels

REVIEW ARTICLE Acta Pædiatrica ISSN 0803–5253

Lumbar disc herniation in young children

R Haidar (rh00@aub.edu.lb)[1], I Ghanem[2], S Saad[3], I Uthman[4]

1.Department of Surgery, American University of Beirut Medical Center, Beirut, Lebanon
2.Department of Orthopedic Surgery, Saint-Joseph University, Beirut, Lebanon
3.Department of Physiology, Faculty of Medicine, American University of Beirut, Beirut, Lebanon
4.Department of Internal Medicine, American University of Beirut Medical Center, Beirut, Lebanon

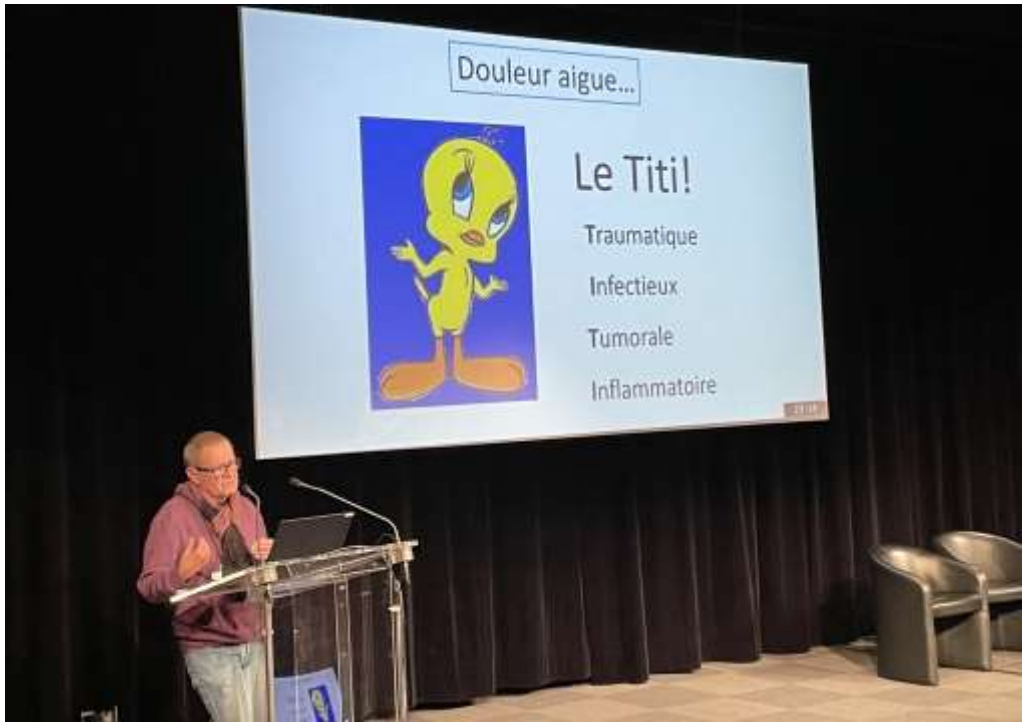


Table 1 Differential diagnosis of back pain and/or radiculopathy in children (18)

Disease entity	Relevant history	Clinical correlate
Disc herniation	Trauma Family history	Back pain with radiation to lower extremity
Discitis or Vertebral osteomylitis	Trauma Infection (urinary tract infection or otitis)	Fever Malaise Loss of appetite and weight Limping Low back pain High ESR
Spondylolysis or Spondylolisthesis	Children participating in sports (microtrauma and hyperextension of the spine)	Localized back pain (lower lumbar region) Tight hamstrings Phalen-Dixon sign (walking with knees and hips flexed) Flattened buttocks and protruding abdomen (spondylolisthesis)
Neoplasms	No history of trauma	Persistent night pain Pain unrelated to physical activities and unresponsive to rest Localized pain
Shmorl's nodes	Trauma Family history	Pain at the thoracolumbar junction Generalized thoracic disc discomfort Remarkable inability of bending forward

ESR = erythrocyte sedimentation rate.

Diagnostic positif

IRM +++
Séquences T1-T2
Voir plus

Scanner:
Os
À éviter

HORS-SUJET
Cf Pr Ph. VIOLAS

Rx: posture

Plutôt EOS

Traitement conservateur

Conditions:

-Absence de troubles moteurs ou sphinctériens

-Élimination de diagnostic différentiels

Première intention

REPOS

EVICTION activités douloureuses /sollicitantes

KINESITHERAPIE (musculation, récupération amplitudes) : prévention des récidives

MEDICAMENTS: palier I, AINS… paliers II-III

CORSETS: évoqués

Pas d'évaluation

INJECTIOSN EPIDURALES stéroides :

Slotkin et al. 2007

Traitement conservateur

Eur Spine J (2010) 19:205–214
DOI 10.1007/s00586-009-1202-7

REVIEW ARTICLE

A review of current treatment for lumbar disc herniation in children and adolescents

Lei Dang · Zhongjun Liu

Wang et al.
European Journal of Medical Research (2022) 27:82
https://doi.org/10.1186/s40001-022-00696-x

European Journal of Medical Research

CASE REPORT Open Access

Pediatric lumbar disc herniation: a report of two cases and review of the literature

Yi Wang[1*†], Yan Xu[2†], Guogang Tian[1] and Guogang Dai[1]

Taux d'efficacité rapporté:

25-50%

A study by Wang et al. [22] reported to cases of pediatric lumbar disc herniation who were aged 10- and 13-year-old. Both patients underwent nonsurgical treatment and had favorable outcomes with no recurrence after follow-up. The study suggested that nonsurgical treatment may be effective in treating pediatric disc herniation.

Traitement intradiscal

Eur Spine J (2010) 19:205–214
DOI 10.1007/s00586-009-1202-7

REVIEW ARTICLE

A review of current treatment for lumbar disc herniation in children and adolescents

Lei Dang · Zhongjun Liu

Chimio-nucleolyse (*chymopapaïne)*
3 études

Propositions d'indications :
-radiculalgie > lombalgie
-Lasègue sévère
-hernie discale molle au scanner

Table 1 Clinical outcome of chemonucleolysis as reported in the literature

Study	Year	No. patients	Age[a] (years)	Follow-up period[a] (years)	Success rate (%)	Re-op rate (%)
Kuh et al. [41]	2005	65	18.4 (10–20)	N/A (1–4)	89	11
Bradbury et al. [44]	1996	42	N/A (13–19)	8.5 (N/A)	64	26
Lorenz and McCulloch [43]	1985	54	N/A (13–19)	4.5 (2–12)	80	20

N/A Not available

[a] The values are given as the means, with the ranges in the parenthesis

1 cas de choc anaphylactique
Effet indésirable: aggravation post procdurale de la lombalgie

Traitement chirurgical: indications et principes

Absence de réponse satisfaisante au traitement conservateur
Aggravation de la symptomatologie
Signes neurologique déficitaire

DECOMPRESSION RADICULAIRE par retrait de fragment discal hernié
+/- DISCECTOMIE
+/- HEMILAMINECTOMIE
+/- ARTHRODESE

Traitement chirurgical : les premières

1960 1er cas chirurgical

INTERVERTEBRAL DISK PROTRUSIONS IN CHILDHOOD AND ADOLESCENCE*

By JOHN E. A. O'CONNELL

DEPARTMENT OF NEUROLOGICAL SURGERY, ST. BARTHOLOMEW'S HOSPITAL, E.C.1

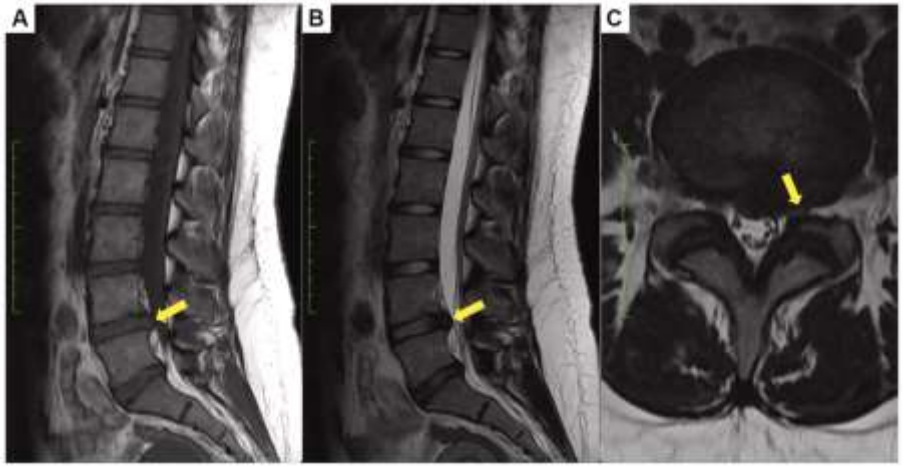
Case report

Lumbar disc herniation in a 15-year-old girl: A case report☆

Fachriy Balafif[a], Muhammad Faris[a,b,*,**], Eko Agus Subagio[a], Abdul Hafid Bajamal[a], Annie Kusumadewi[c]

[a] Department of Neurosurgery, Universitas Airlangga – Dr. Soetomo General Academic Hospital, Surabaya, East Java, Indonesia
[b] Department of Neurosurgery, Adi Husada Undaan Hospital, Surabaya, East Java, Indonesia
[c] Department of Pediatrics, Adi Husada Undaan Hospital, Surabaya, East Java, Indonesia

4 ans lombradiculalgie gauche
Aggravation 6 derniers mois
Port de charges lourdes, traumas itératifs
IMC 27,3 kg/m^2
AINS et injection corticoïdes dans le piriforme
Lasègue +
Pas de trouble moteur ni sphinctérien



Microdiscectomie
Progrès précoces, Sortie à 48h
Pas de douleur ni de signe neurologique à 3 mois post op

This is the first pediatric LDH case report in Indonesia.

Traitement chirurgical : le plus jeune

J Neurosurg Pediatrics 2:133–135, 2008

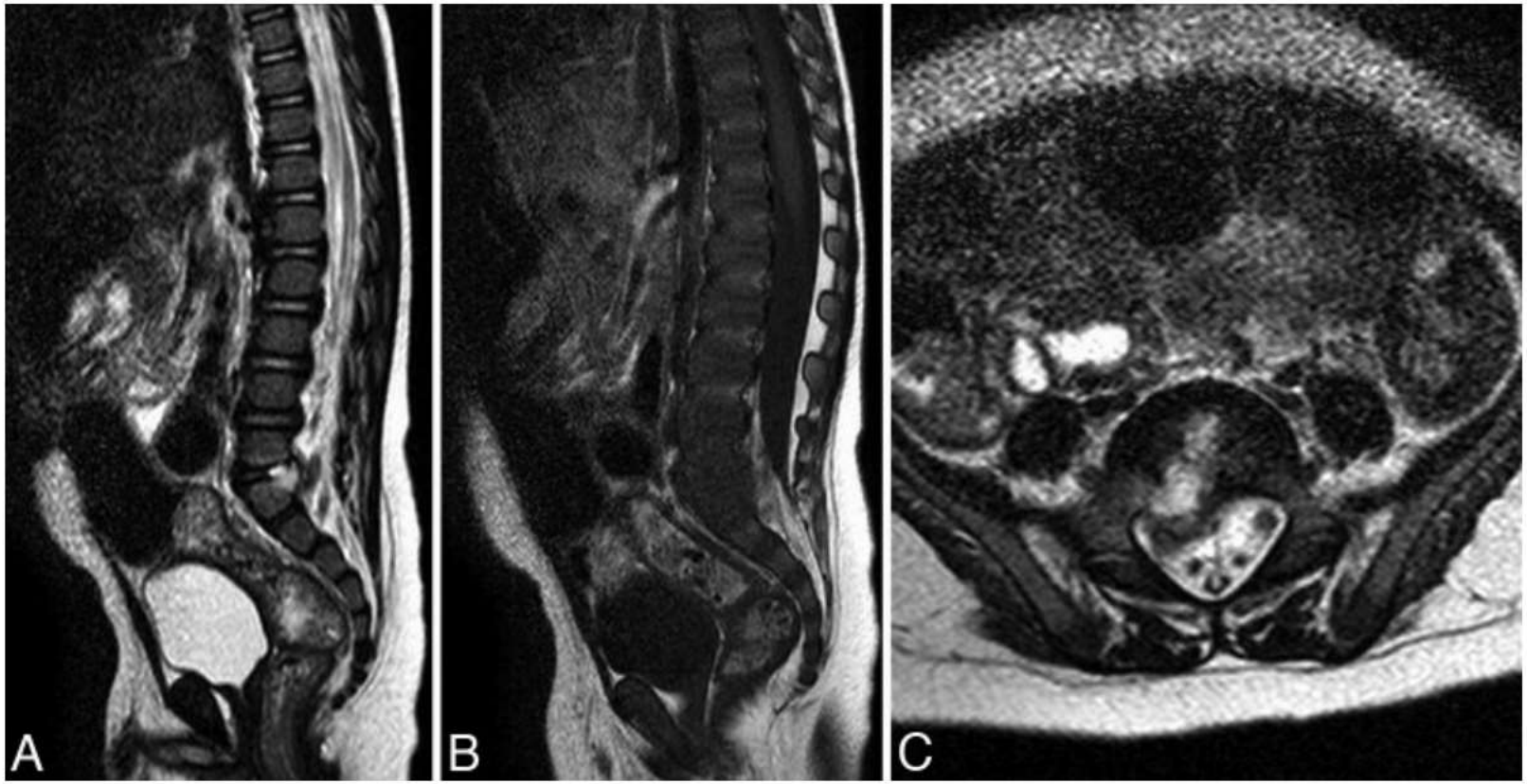
1 mois d'inconfort
Refus marche, rampe, station debout
Mobilisation douloureuse des membres inférieurs

Unilateral partial hemilaminectomy for disc removal in a 1-year-old child

Case report

Mony Benifla, M.D.,[1] Igor Melamed, M.D.,[1] Revital Barrelly, M.D.,[1] Andrey Aloushin, M.D.,[1] and Ilan Shelef, M.D.[2]

Departments of [1]Neurosurgery and [2]Neuroradiology, Soroka University Medical Center and Ben-Gurion University of the Negev, Beer Sheva, Israel



Traitement chirurgical : cas rapportés

Surgical management of lumbar disc herniation in children and adolescents

Ashley Laurence Bharat Raghu[a,c,*], Anthony Wiggins[b], Jothy Kandasamy[c,d]

[a] Oxford Functional Neurosurgery, Nuffield Department of Surgical Sciences, University of Oxford, Oxford, OX3 9DU, United Kingdom
[b] Department of Clinical Neurosciences, NHS Lothian, Edinburgh, EH4 2XU, United Kingdom
[c] Edinburgh Medical School, University of Edinburgh, Edinburgh, EH16 4TJ, United Kingdom
[d] Department of Paediatric Clinical Neurosciences, Royal Hospital for Sick Children, NHS Lothian, Edinburgh, EH9 1LF, United Kingdom

Table 1
Surgical LDH case reports*.

Year	Authors	Age	Sex	Features	Surgical outcome
2008	Benifla et al. [13]	1 year	M	Youngest ever reported	Resolution
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2017	Kadam et al. [20]	15 years	M	Ring apophysis fracture (fall)	Resolution
2013	Fridley et al. [21]	16 years	F	US-guided epidural blood patch	Resolution
		17 years	F	US-guided epidural blood patch	Resolution
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		21 years	M	Painful scoliosis	Resolution

* Reports of 4 paediatric cases or less.

The largest recent series measuring this found 51% of patients 17–18 years of age, 46.5% 13–16 years and 2.5% 12 years or younger [4]. To our knowledge, there have been only 8 published surgical cases of children below 10 years old in the last 30 years [13–15,41–44]. Recent

Traitement chirurgical : les séries

Surgical management of lumbar disc herniation in children and adolescents

Ashley Laurence Bharat Raghu[a,c,*], Anthony Wiggins[b], Jothy Kandasamy[c,d]

[a] Oxford Functional Neurosurgery, Nuffield Department of Surgical Sciences, University of Oxford, Oxford, OX3 9DU, United Kingdom
[b] Department of Clinical Neurosciences, NHS Lothian, Edinburgh, EH4 2XU, United Kingdom
[c] Edinburgh Medical School, University of Edinburgh, Edinburgh, EH16 4TJ, United Kingdom
[d] Department of Paediatric Clinical Neurosciences, Royal Hospital for Sick Children, NHS Lothian, Edinburgh, EH9 1LF, United Kingdom

Table 2
Patient and clinical characteristics of surgically managed paediatric LDH cases 2008-2018.

Authors	Country	No.	L4/L5	L5/S1	Other	M	F	Motor	SLR -(FNS)	DTR	B-B	Sx
Case reports	Mixed	16	8	5	3	13	3	4	12	3	1	O, M
2008 Chang et al. [24]	Taiwan	32	20	10	2	–	–	–	–	–	–	O
2009 Fakouri et al. [25]	UK	6	4	2	0	4	2	2	6	–	0	M
2009 Cahill et al. [4]	US	87	39	31	17	35	52	22	81	19	2	M
2011 Zhu et al. [26]	China	26	14	6	6	18	8	4	18	–	0	M
2011 Thomas et al. [27]	US	6	3	3	0	2	4	2	6	0	0	T
2011 Çelik et al. [8]	Turkey	32	16	16	0	14	18	–	–	–	–	M
2013 Kwon et al. [28]	S.Korea	18	13	2	3	16	2	–	–	–	–	PLIF, TLIF
2013 Singhal et al. [3]	Canada	30	–	–	–	–	–	–	–	–	–	M
2013 Wang et al. [29]	China	121	61	42	18	95	26	69	109	40	0	O, T, E
2014 El-Kader et al. [30]	Egypt	25	14	8	3	18	7	2	–	–	0	O, M, E
2014 Wang et al. [31]	China	29	9	20	0	21	8	13	18	–	0	E
2015 Dang et al. [32]	China	63	37	26	0	37	26	–	–	–	–	O ± A
2015 Lägerback et al. [9]	Sweden* *a)*	151	70	72	9	75	76	–	–	–	–	O, M
2016 Strömqvist et al. [12]	Sweden* *b)*	74	38	36	2	31	43	–	–	–	–	O, M
2016 Strömqvist et al. [11]	Sweden* *c)*	180	94	84	2	89	91	–	–	–	–	O, M
2016 Sarma et al. [33]	India	28	18	4	6	–	–	16	26	–	2	O
2016 Zheng et al. [34]	China	12	5	4	3	7	5	12	4, (8)	8	0	E
2017 Montejo et al. [35]	US	12	3	9	0	5	7	8	10	–	0	T
2017 Gulati et al. [10]	Norway	97	55	39	3	49	48	–	–	–	–	M
2017 Zhang et al. [36]	China	80	44	36	0	62	18	–	–	–	–	–
2018 Tu et al. [37]	China	74	51	22	1	55	19	–	–	–	–	E
2018 Xu et al. [38]	China	23	0	23	0	13	10	14	18	–	0	E
2018 Li et al. [39]	China	78	40	30	8	50	28	–	–	–	–	T, E
2018 Chen et al. [40]	China	19	7	12	0	17	2	5	19	5	0	E
TOTAL†		1094	555	434	75	620	384	173	335	75	5	
%			52	41	7	62	38	43	88	31	1	

Other = other level or multilevel, SLR = straight leg raising test, FNS = femoral nerve stretch test, DTR = deep tendon reflex, B-B = bladder or bowel symptoms, Sx = surgery, O = open, M = microdiscectomy, T = tubular, E = endoscopic, A = arthrodesis, P/TLIF = posterior/transforaminal interbody fusion.
* All derived from SweSpine. a) ≤18, b) ≤17, c) ≤20 years old. †Only including [11] from SweSpine.

Traitement chirurgical : évolutions

Open

microscope

Écarteur tubulaire

endoscopie

laser

Traitement chirurgical : mini-invasif tubulaire

-cas pédiatriques < 20 ans
-diagnostic clinique et IRM
-chirurgie mini-invasive par micro-discectomie écarteur tubulaire
-juillet 2011-octobre 2015

IATRICS CLINICAL ARTICLE
J Neurosurg Pediatr 21:449–455, 2018

Tubular approach to minimally invasive microdiscectomy for pediatric lumbar disc herniation

Julio D. Montejo, BA,[1] Joaquin Q. Camara-Quintana, MD,[1] Daniel Duran, MD,[1] Jeannine M. Rockefeller, MSN, APRN,[1] Sierra B. Conine,[1] Alyssa M. Blaise,[1] Kristopher T. Kahle, MD, PhD,[1–3] and Michael L. DiLuna, MD[1,2]

Departments of [1]Neurosurgery, [2]Pediatrics, and [3]Cellular & Molecular Physiology and Centers for Mendelian Genomics, Yale School of Medicine, New Haven, Connecticut

TABLE 1. Summary of 12 consecutive patients with pediatric LDH treated with MIS tubular microdiscectomy

Age (yrs), Sex	Pain Duration (mos)	Myotomal Leg Weakness*	Level	Intraop EBL (ml)†	LOS (days), Reason	Follow-Up (yrs)	30-Day Complications	Pain & Weakness Outcome	Macnab Criteria	Low-Back Pain ODI Category
17, F	9	4 DF	L5–S1	Minimal	1, PP	5.8	No	Weakness resolved & pain improved	Good	Moderate
18, M	2	4 DF, 3 EHL	L5–S1	Minimal	0	0	NA	Lost to follow-up	NA	NA
16, F	12	None	L5–S1	Minimal	1, PP	2.0	No	Pain resolved (required redo op)	Excellent	NA
19, F	6	4 TA	L4–5	Minimal	1, PP	3.3	No	Weakness & pain resolved	Excellent	Minimal
18, M	11	4 DF/PF & 4 EHL	L5–S1	Minimal	1, PP	3.0	No	Weakness resolved & persistent pain	Fair	Severe
17, M	12	4 TA/EHL	L5–S1	Minimal	0	2.8	No	Weakness & pain resolved	Excellent	Minimal
15, F	36	4 TA/EHL	L4–5	Minimal	3, PC	0.5	No	Weakness resolved & pain improved	Good	NA
18, F	4	None	L5–S1	Minimal	0	0.1	No	Pain resolved	Excellent	NA
13, M	1	4 TA & 3 EHL	L4–5	Minimal	1, PP	2.6	No	Weakness & pain resolved	Excellent	Minimal
16, F	6	None	L5–S1	Minimal	1, PP	2.1	No	Weakness & pain resolved	Excellent	Minimal
18, F	18	None	L5–S1	Minimal	2, PC	2.2	No	Pain improved	Good	Moderate
17, M	9	4 DF & 3 EHL	L5–S1	50	1, PP	0.2	No	Weakness resolved & pain improved	Good	NA

DF = dorsiflexion; EHL = extensor hallucis longus; NA = not available; PC = pain control; PF = plantar flexion; PP = parent preference; TA = tibialis anterior.
* Muscle group strength was measured on an ascending scale from 0 (completely flaccid) to 5 (normal strength).
† Minimal EBL was defined as ≤ 25 ml.

Traitement chirurgical : endoscopie

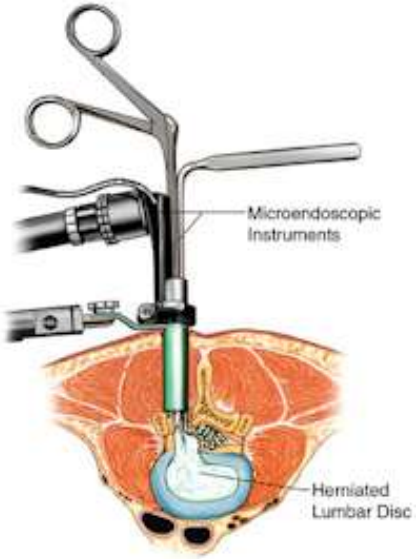
Pediatric applications of endoscopic spine surgery

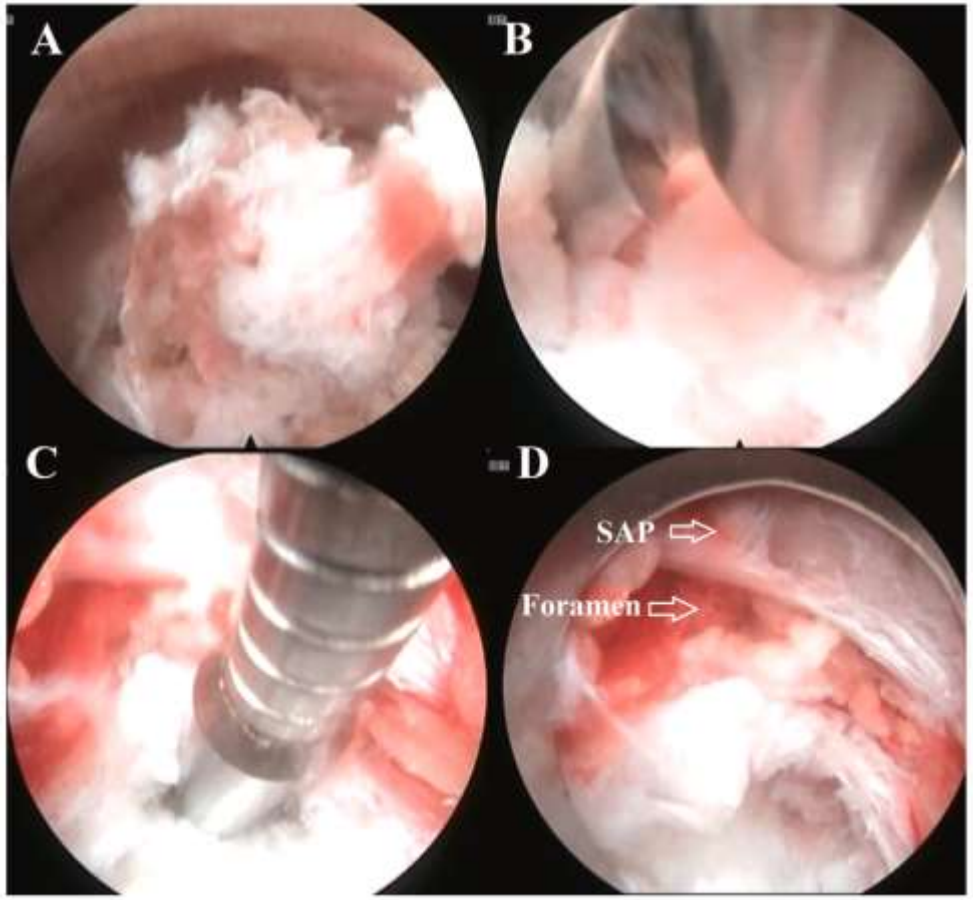
Ankush Bajaj, BS, Albert E. Telfeian, MD, PhD *

Department of Neurosurgery, Rhode Island Hospital, The Warren Alpert Medical School of Brown University, Providence, RI, United States

3 cas de hernie discale
4 ans de recul

Élément monobloc
canal de travail + optique
(taille d'un stylo standard)
Voie interlamaire
Ou Voie transforaminale





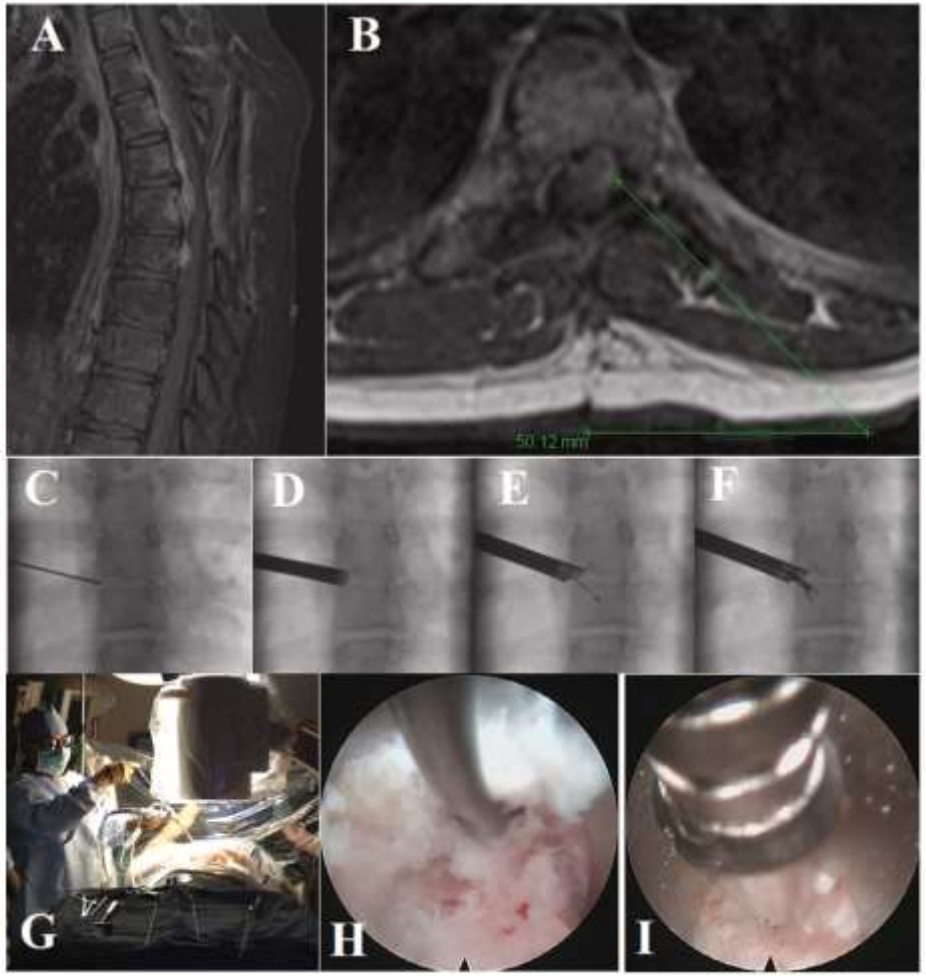
CHIRURGIE EVEILLEE , PRISE EN CHARGE AMBULATOIRE

Traitement chirurgical : endoscopie

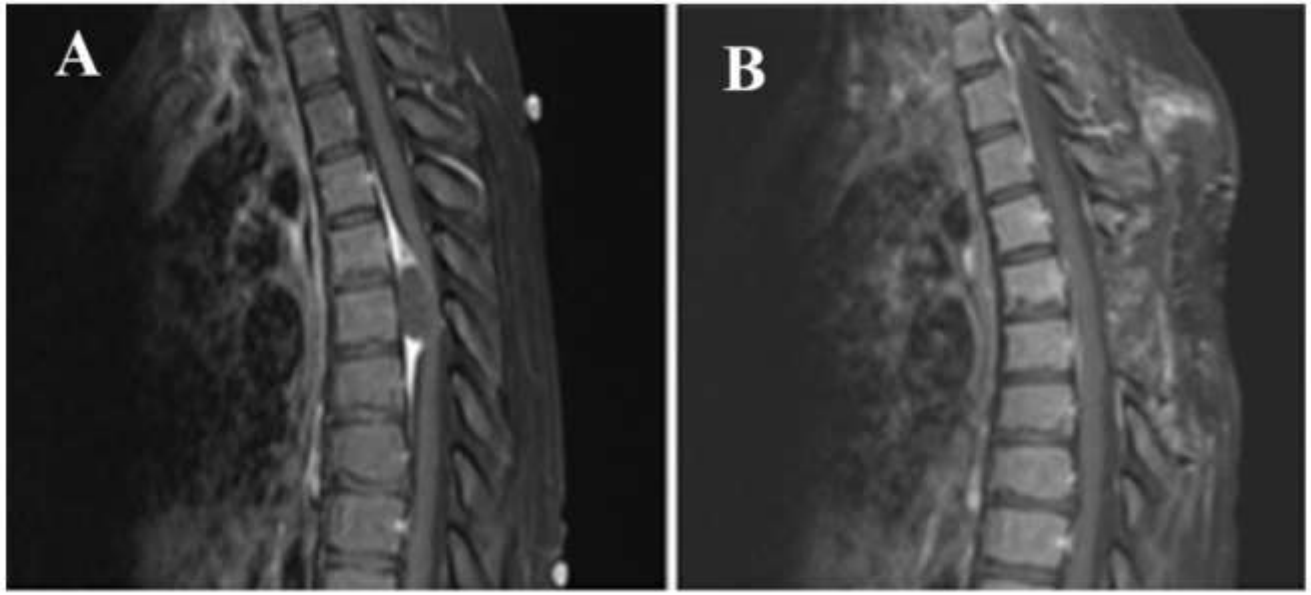
Pediatric applications of endoscopic spine surgery

Ankush Bajaj, BS, Albert E. Telfeian, MD, PhD *

Department of Neurosurgery, Rhode Island Hospital, The Warren Alpert Medical School of Brown University, Providence, RI, United States



1 cas de sténose par tumeur
Approche transforaminale
après chirurgie postérieure et latérale ouverte



Traitement chirurgical : endoscopie

Interdisciplinary Neurosurgery: Advanced Techniques and Case Management 30 (2022) 101642

Overview of studies evaluating endoscopic lumbar discectomy in pediatric populations: 2010–2021.

Study	Sample Size	Age (range)	Approach	Levels	Outcomes	Mean Follow-Up
Lin et al, 2021 [2]	10	13–17	PELD	L4-L5, L5-S1	VAS back: 95.2 % reduction VAS leg: 92.7 % reduction	12 months
Chen et al, 2019[15]	19	13–18	PELD	L4-L5, L5-S1	VAS back: 89.7 % reduction VAS leg: 98.5 % reduction	41.7 months
Zheng et al, 2016[7]	12	11–16	*T*-PELD	L3-L4, L4-L5, L5-S1	VAS leg: 75.6 % reduction	12 months
Wang et al, 2014[6]	29	13–18	I-PELD	L4-L5, L5-S1	VAS back: 91.8 % reduction VAS leg: 94.7 % reduction	19.7 months

75,6 et 98,5% de réduction satisfaisante des symptômes

PELD: percutaneous endoscopic lumbar disc herniation

Chen et al: 1/19 récidive de hernie

Courbe d'apprentissage +++

Traitement chirurgical : apprentissage des techniques innovantes

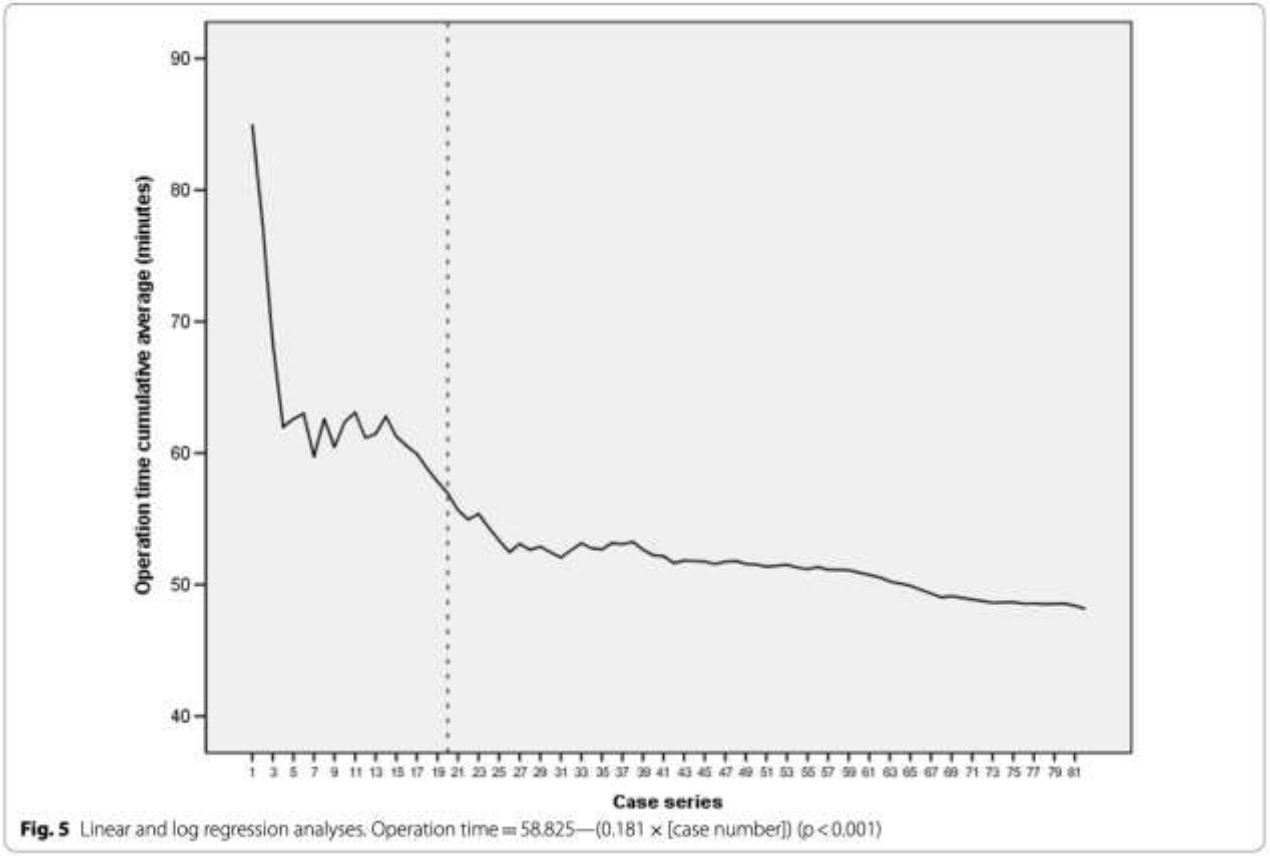


Fig. 5 Linear and log regression analyses. Operation time = 58.825—(0.181 × [case number]) ($p < 0.001$)

Son et al. BMC Surg (2021) 21:39
https://doi.org/10.1186/s12893-020-00949-8

BMC Surgery

RESEARCH ARTICLE Open Access

Learning curve of trans-sacral epiduroscopic laser decompression in herniated lumbar disc disease

Seong Son, Chan Jong Yoo*, Byung Rhae Yoo, Woo Seok Kim and Tae Seok Jeong

Table 4 Clinical outcomes between the two groups

	Early group (n = 20)	Late group (n = 62)	OR or difference	95% CI	P value
VAS for low back pain					
Preoperative	5.60 ± 1.82	5.29 ± 1.68	0.31 ± 0.546	− 0.791–1.422	0.568[†]
1 week	3.45 ± 1.79	3.00 ± 1.00	0.45 ± 0.45	− 0.462–1.366	0.324[†]
1 month	2.71 ± 1.40	2.47 ± 1.74	0.24 ± 0.54	− 0.878–1.342	0.667[†]
6 months	2.89 ± 1.69	2.80 ± 1.32	0.09 ± 0.62	− 1.194–1.371	0.887[†]
VAS for leg pain					
Preoperative	6.15 ± 1.63	6.05 ± 1.75	0.10 ± 0.53	− 0.977–1.174	0.847[†]
1 week	4.00 ± 1.56	3.81 ± 2.09	0.019 ± 0.58	− 0.983–1.367	0.743[†]
1 month	3.53 ± 2.15	3.18 ± 2.60	0.35 ± 0.82	− 1.320–2.022	0.670[†]
6 months	3.56 ± 1.67	3.60 ± 2.35	0.04 ± 0.90	− 1.917–1.821	0.961[†]
Odom's criteria					
1 week, Excellent/good/fair/poor	2/11/6/1	8/29/24/1			0.577[‡]
1 month, Excellent/good/fair/poor	3/8/9/0	17/20/25/0			0.383[§]
6 months, Excellent/good/fair/poor	2/9/7/2	14/23/23/2			0.231[#]

Temps opératoire

Mais pas de retentissement sur résultats cliniques, radiologiques et durée d'opération

Traitement chirurgical : complications

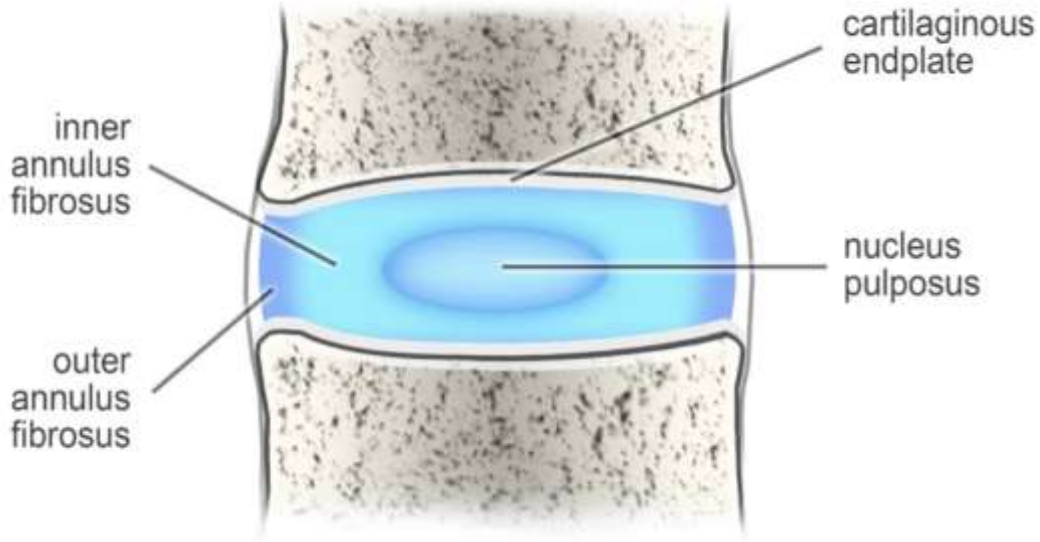
Clinical Neurology and Neurosurgery 185 (2019) 105486

Table 5
Complications of intervertebral disc surgery.

Authors	No.	Peri- and post-operative complications	Long-term complications	Unsatisfactory outcomes
Mixed				
Under 10 years old [13,14,15]	3	None reported	None reported	None reported
Wang et al. [29]	121	1 dysaesthesia 1 CSF leak 1 haematoma elimination	2 recurrence	3 Macnab poor score
Strömqvist et al. [11]	180	1 ganglion injury 6 durotomy	–	8 unsatisfied with surgery
Li e				
El-K				
Ope				
Dan				
P/T				
Kwo				
Mic				
Fak				
Cah				
Gul				
Tub				
Tho				
Mor				
Endoscopic				
Wang et al. [31]	29	1 neurological deficit 2 transient worsening of pain	None reported	2 Macnab fair scores
Zheng et al. [34]	12	1 neurological deficit 1 ganglion injury	None reported	1 persistent numbness 1 Macnab fair score
Tu et al. [37]	74	1 durotomy 2 dysesthesias	2 recurrence	2 Macnab fair 1 Macnab poor score
Xu et al. [38]	23	2 leg numbness	1 same level operation	3 Macnab fair scores
Chen et al. [40]	19	1 same level operation	None reported	None reported

- hématome du foyer opératoire (1-4%)
- retard de cicatrisation (3%)
- Infection
- diminution de l'espace discal
- dégénération du disque adjacent (sans effet clinique rapporté)
- atteinte des facettes articulaires (+/- instabilité, déformation)
- récidive de hernie discale : 5 - 10%.

Traitement chirurgical : extension du geste



Zielinska et al., 2021

SURGERY

Lumbar Intervertebral Disc Herniation in Children Less Than 16 Years of Age

Long-Term Follow-up Study of Surgically Managed Cases

Ishihara, Hirokazu MD, PhD; Matsui, Hisao MD, PhD; Hirano, Norikazu MD, PhD; Tsuji, Haruo MD, PhD

Author Information

Spine 22(17):p 2044-2049, September 1, 1997.

Exérèse insuffisante du noyau pulpeux : echec

Discectomie étendue : sténose espace discal/dégénération

Respecter l'intégrité de l'anneau fibreux
(synthèse active des protéoglycanes: régénération du disque)

Traitement chirurgical : post opératoire

Clinical Neurology and Neurosurgery 185 (2019) 105486

Micro-discectomie vs Endoscopie

Table 3
Comparison of surgical techniques by Macnab outcomes and post-operative length of stay.

Authors	Surgical technique (patients)	Post-operative length of stay	Mean follow-up (months)	Macnab excellent %
2009 Fakouri et al. [25]	Microdiscectomy (6)	Within 2 days	13	≥50 (estimated)
2009 Cahill et al. [4]	Microdiscectomy (87)	Mean 1.3 days	12.5	–
2011 Thomas et al. [27]	Tubular (6)	Mean 1.3 days	10.2	≥50 (estimated)
2013 Wang et al. [29]	Open (16)	Mean 10.6 days	At discharge	48
	Tubular (80)	Mean 7.3 days		
	Endoscopic (25)	Mean 4.4 days		
2013 Singhal et al. [3]	Microdiscectomy (30)	–	–	68
2014 Wang et al. [31]	Endoscopic (29)	Within 24 hours	19.7	83
2016 Zheng et al. [34]	Endoscopic (12)	Same day	Minimum of 12	50
2017 Montejo et al. [35]	Tubular (12)	Median 1 day	24.6	64
2018 Tu et al. [37]	Endoscopic (42)	–	39.0	43
2018 Xu et al. [38]	Endoscopic (23)	–	19.7	78
2018 Li et al. [39]	Tubular (38)	Mean 4.8 days	67.1	–
	Endoscopic (40)	Mean 3.8 days	68.9	–
2018 Chen et al. [40]	Endoscopic (20)	–	41.7	53
AVERAGE				55

Soulagement de la douleur comparable
Durée d'hospitalisation moindre avec l'endoscopie

Yu et al. 2021

1,7 - 7,3 jours vs 0 - 4,4 jours

Traitement chirurgical : Indications de décompression (endoscopique)

-échec après 6 semaines de traitement conservateur
-un disque plutôt intact en comparaison
-disque exclu ou protrus dans l'espace sous ligamentaire.

Lei DANG et al. Eur SPine 2010

Traitement chirurgical : Indications d'arthrodèse

-hernie discale avec spondylolisthésis ou signes évidents d'instabilité
-laminectomie étendue
-incompétence des articulaires postérieures (congénitale, dégénérative ou iatrogénique)

Littérature:
Pas d'amélioration du devenir
Pas d'amélioration du risque de récidive
Coût en temps , sang et argent majoré

Lei DANG et al. Eur SPine 2010

Traitement choix thérapeutiques : les 4 éléments

Littérature

Prudence
Pédiatrique

Satisfaction
Chirurgicale

Histoire naturelle

Artus Wolffort

Traitement choix thérapeutiques

Eur Spine J (1996) 5 : 220–224

ORIGINAL ARTICLE

A. A. Kurth
S. Rau
C. Wang
E. Schmitt

Treatment of lumbar disc herniation in the second decade of life

10-20 ans:
pas de différence significative conservateur vs opéré
suivi 5,4 ans

Spine

SPINE Volume 45, Number 12, pp 825–831

LITERATURE REVIEW

Systematic Review of Outcomes Following 10-Year Mark of Spine Patient Outcomes Research Trial for Intervertebral Disc Herniation

Brittany A. Oster, BS, Sina Rashidi Kikanloo, BA, Nicole L. Levine, BA, Jayson Lian, BA, and Woojin Cho, MD, PhD

traitement conservateur moins souvent efficace dans la population pédiatrique que dans la population adulte.
Idem étude SPORT: un **retour à l'état antérieur plus précoce** grâce à la chirurgie (étude SPORT) et donc une remise en activité

résultats chirurgicaux à long terme moins bons qu'à court terme
(67-88% versus 93-100%)
mais pérénité supérieure aux observations adultes.

Biais de récit / littérature

Authors	Country	No.
Case reports	Mixed	16
2008 Chang et al. [24]	Taiwan	32
2009 Fakouri et al. [25]	UK	6
2009 Cahill et al. [4]	US	87
2011 Zhu et al. [26]	China	26
2011 Thomas et al. [27]	US	6
2011 Çelik et al. [8]	Turkey	32
2013 Kwon et al. [28]	S.Korea	18
2013 Singhal et al. [3]	Canada	30
2013 Wang et al. [29]	China	121
2014 El-Kader et al. [30]	Egypt	25
2014 Wang et al. [31]	China	29
2015 Dang et al. [32]	China	63
2015 Lägerback et al. [9]	Sweden* *a)*	151
2016 Strömqvist et al. [12]	Sweden* *b)*	74
2016 Strömqvist et al. [11]	Sweden* *c)*	180
2016 Sarma et al. [33]	India	28
2016 Zheng et al. [34]	China	12
2017 Montejo et al. [35]	US	12
2017 Gulati et al. [10]	Norway	97
2017 Zhang et al. [36]	China	80
2018 Tu et al. [37]	China	74
2018 Xu et al. [38]	China	23
2018 Li et al. [39]	China	78
2018 Chen et al. [40]	China	19
TOTAL†		1094
%		

Séries chirurgicales

Interestingly, Obukhov and colleagues reported the occurrence of multi-level disc herniation in two 12-year-old twins. twin A, experienced backache and radiating left leg pain after helping move some tables. Her neurological examination revealed a left tibial H-reflex latency 1.3 ms greater than the right, and a lumbar CT scan revealed central disc herniation at the L4-5 and L5-S1 levels. Her twin sister, twin B, had a history of back pain, and a lumbar MRI at the level of L4/L5 revealed obvious disc herniation. Their mother had a history of back pain and a maternal aunt had back problems complicating rheumatoid arthritis/lupus syndrome. Both of the cases were managed conservatively, and the symptoms of both twins resolved [17].

A study by Wang et al. [22] reported to cases of pediatric lumbar disc herniation who were aged 10- and 13-year-old. Both patients underwent nonsurgical treatment and had favorable outcomes with no recurrence after follow-up. The study suggested that nonsurgical treatment may be effective in treating pediatric disc herniation.

Cas rapportés

Mais pas d'études prospectives randomisées

Biais de récit / littérature: exemple du chiari

ıg editorial in this issue, pp 177–178.

J Neurosurg Pediatrics 2:179–187, 2008

The natural history of the Chiari Type I anomaly

FEDERICA NOVEGNO, M.D., MASSIMO CALDARELLI, M.D., ANTONIO MASSA, M.D., DANIELA CHIEFFO, PH.D., LUCA MASSIMI, M.D., BENEDETTA PETTORINI, M.D., GIANPIERO TAMBURRINI, M.D., AND CONCEZIO DI ROCCO, M.D.

Department of Pediatric Neurosurgery, Catholic University Medical School, Rome, Italy

73% d'évolution spontanément favorable

Beware of **V.O.M.I.T.** *Dominic Thompson*

Bases de données chirurgicales

TABLE 3. Intraoperative complications and complications within and beyond 6 months

Variable	PFD (n = 117)	PFDD (n = 575)	p Value	OR*	95% CI
No. of pts w/ intraop complications (%)	0 (0)	4 (0.7)	>0.99		
Vascular injury	0	2	>0.99		
Hemorrhage	0	2	>0.99		
Neurological injury	0	2	>0.99		
Death	0	0			
Other complications	0	3	>0.99		
No. of pts w/ complications w/in 6 mos (%)	16 (13.7)	140 (24.3)	**0.01**	0.49	0.26–0.87
Pseudomeningocele	3	44	**0.04**	0.32	0.06–0.94
CSF leak	5	35	0.52	0.69	0.21–1.82
Received surgical treatment (wound oversewing or surgical wound revision)	4	19	>0.99	1.03	0.24–3.20
Received no surgical treatment	1	16	0.33	0.30	0.01–1.98
External CSF drainage required	2	17	0.75	0.57	0.05–2.46
Meningitis	2	25	0.18	0.38	0.04–1.57
Chemical meningitis	2	20	0.32	0.48	0.05–2.03
Infectious meningitis	0	5	0.59		
Postop hydrocephalus	1	12	0.71	0.40	0.01–2.79
Cervical instability	1	3	0.52	1.64	0.03–20.66
Managed w/ cervical collar	1	2	0.43	2.47	0.04–47.73
Necessitating fusion	0	1	>0.99		
Infection	2	2	0.13	4.98	0.36–69.14
No. of pts w/ complications beyond 6 mos (%)	1 (0.9)	16 (2.8)	0.33	0.30	0.01–1.98
Cervical instability	0	1	>0.99		
Fusion requirement	0	1	>0.99		
Infection	0	1	>0.99		
Pseudomeningocele	0	3	>0.99		
Hydrocephalus	0	3	>0.99		
Shunt placement	0	2	>0.99		
Syrinx shunt placement	1	5	>0.99	0.98	0.02–8.90

Park-Reeves Syringomyelia Research Consortium Study

Protocole National de Diagnostic et de Soins (PNDS)
Malformation de Chiari

Diagnostic et parcours thérapeutique

SC APAISER
ASSOCIATION POUR AIDER, INFORMER, SOUTENIR ETUDES & RECHERCHES POUR LA SYRINGOMYELIE & LE CHIARI

Conclusions sur les hernies discales dans la population pédiatrique

Rares voire très rares

Traitement conservateur à privilégier initialement

La chirurgie est efficace

Les techniques récentes les moins invasives sont recommandées

Parcours de soin dédié ?
Conservateur, infiltratif, rééducatif, chirurgical