CERVICAL SPINE RESEARCH SOCIETY
EUROPE
Founded 1983

Occipitocervical fusion with autologous rib graft in pediatric patients

Takeshi Sakamoto, Ryosuke Tsutsumi,
Ai Fukuda, Kei Watanabe

Department of Orthopaedic Surgery
Osaka Red Cross Hospital
Japan

Cervical Spine Research Society - Europe

CERVICAL SPINE RESEARCH SOCIETY
EUROPE
Founded 1983

COI Disclosure

The authors report no financial disclosures or other conflicts of interest relating to this research.

Introduction & Background

Background: Occipitocervical (OC) fusion must be performed in the pediatric patients with upper cervical instability caused by a variety of congenital conditions.

The patients with spondyloepiphyseal dysplasia congenita (SEDC) or Down syndrome (DS) have characteristics that the odontoid process is dysplastic and delayed in ossification with risk of atlantoaxial instability which can lead to myelopathy. In general the iliac crest is the most frequently selected site for bone graft. However, the quantity of iliac crest autograft cannot be enough in pediatric patients.

We report 5 cases of OC fusion with autologous rib grafts which have modifiable contour and provide low donor site morbidity.

Purpose: To evaluate surgical outcomes and effectiveness using rib grafts

Materials and Methods

Methods:

- 5 pediatric patients (2 SEDC and 3 DS)
- All patients underwent posterior OC fusion with autologous 9th or 10th rib grafts and maintained the halo-vest immobilization postoperatively.
- The average follow-up period 77.2 months.

Case	Sex	Age	Chief Complaint	DTR	AAS	MRI T2 high signal intensity	Dysplastic odontoid process
1	F	9	progressive gait disturbance urinary disturbance	↑	+	+	+
2	F	14	occipitalgia gait disturbance	↑	+	+	+
3	F	6	snoring gait disturbance	↑	+	+	+
4	F	6	gait disturbance	↑	+	+	+
5	M	9	numbness of foot at cough	↑	+	+	+

DTR, deep tendon reflexes; AAS, atlantoaxial subluxation

Surgical Plan

- Halo-vest immobilization for one week preoperatively
- Posterior occipitocervical fusion with autologous rib grafts and C1 laminectomy
- Halo-vest immobilization maintained postoperatively+

Title: Occipitocervical fusion with autologous rib graft in pediatric patients

CERVICAL SPINE RESEARCH SOCIETY EUROPE Founded 1983

Results

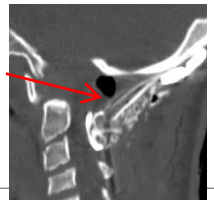
- There were no significant postoperative complications including pneumothorax and intercostal neuralgia.
- Bone union was observed in all patients using postoperative CT at the 1-year follow-up evaluation.
- Postoperative 3D-CT showed almost complete regeneration of the donor site within two years after surgery in all cases.

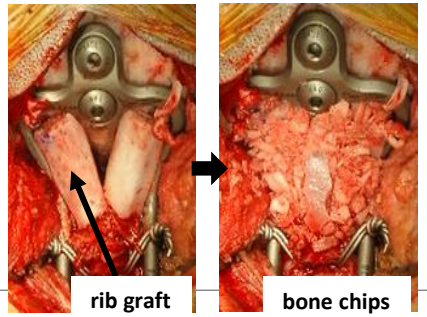
Case	Total operative time	Blood loss (g)	Spinal instrument ⁺	Postoperative fusion	Regeneration of the rib <1 to 4 +>*
1	5h45m	5	Olerud Cervical System	+	++++
2	5h20m	little	RRS Loop Spine System	+	++++
3	5h38m	5	RRS Loop Spine System	+	++++
4	6h32m	6	Olerud Cervical System	+	++++
5	5h30m	30	Olerud Cervical System	+	++++

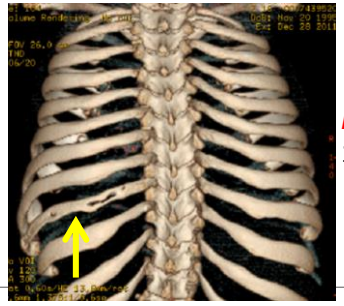
⁺ Olerud Cervical System, Nord Opedic, Sweden
RRS Loop Spine System, ROBERT REID INC, Japan

* Criteria used for evaluating regeneration of the rib, Jorge M. Psillakis,1983

- Case presentation -







Regeneration of the donor 9th rib 1.5 year after surgery

Title: Occipitocervical fusion with autologous rib graft in pediatric patients

CERVICAL SPINE RESEARCH SOCIETY EUROPE Founded 1983

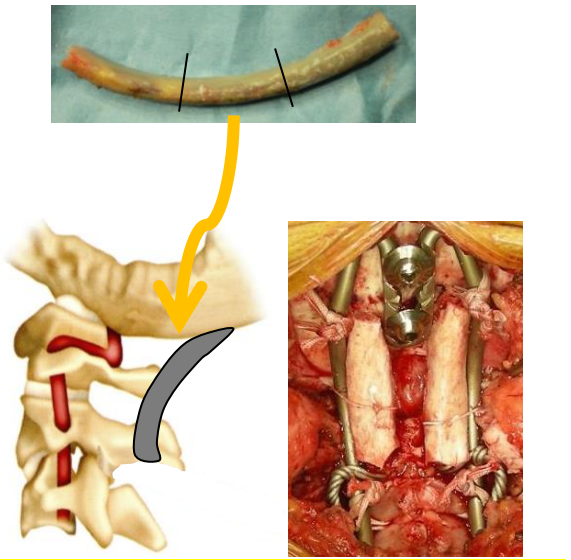
Discussion

➢ Autologous rib graft in occipitocervical fusion

Advantage

Paul D. Sawin, et al.: *J Neurosurg*, 1998
Psillakis JM, et al.: *Ann Plast Surg*, 1983

- ✓ The *rib's unique curvature* conforms well to the configuration of the posterior occipitocervical constructs.
  - without extensive modeling or bending
- ✓ The rib affords an *abundant source* of graft material.
  - ilium is dysplastic or hypoplastic in SEDC
  - other donor sites are limited in SEDC, infants, and children
- ✓ The fusion rate and donor site morbidity for rib autograft compare favorably with those for iliac crest.
- ✓ The *regeneration of rib* is successful.



A unique curvature is well adapted.

Conclusion

We consider the rib graft in OC fusion is useful for the pediatric patients with upper cervical instability.

36th ANNUAL **MEETING**

CERVICAL SPINE RESEARCH SOCIETY – EUROPE

CERVICAL SPINE RESEARCH SOCIETY
EUROPE
Founded 1983

CERVICAL SPINE RESEARCH SOCIETY
EUROPE
Founded 1983

conventus