

Can prophylactic bilateral C4/5 foraminotomy  
decrease C5 palsy after open -door laminoplasty?  
–A prospective study –

Spine Center, Dept. of Orthopaedic Surgery,  
Niigata Central Hospital

Keiichi Katsumi, MD

Akiyoshi Yamazaki, MD, PhD.

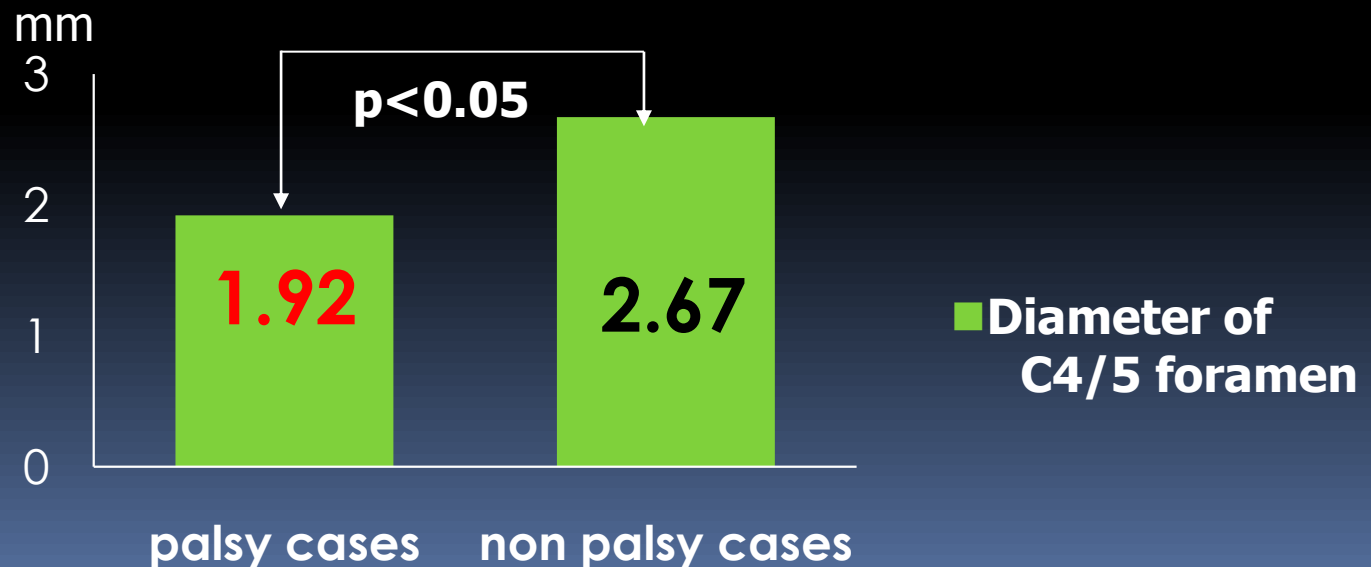
Kei Watanabe MD, PhD

Masayuki Ohashi, MD

# Introduction

- The etiology of C5 palsy after cervical laminoplasty and preventive measures remain unclear.
- Our retrospective review of 150 consecutive cases showed a significant difference in diameter of C4/5 foramen between C5 palsy cases (n=12) and non palsy cases (n=138) ( $p < 0.05$ ).

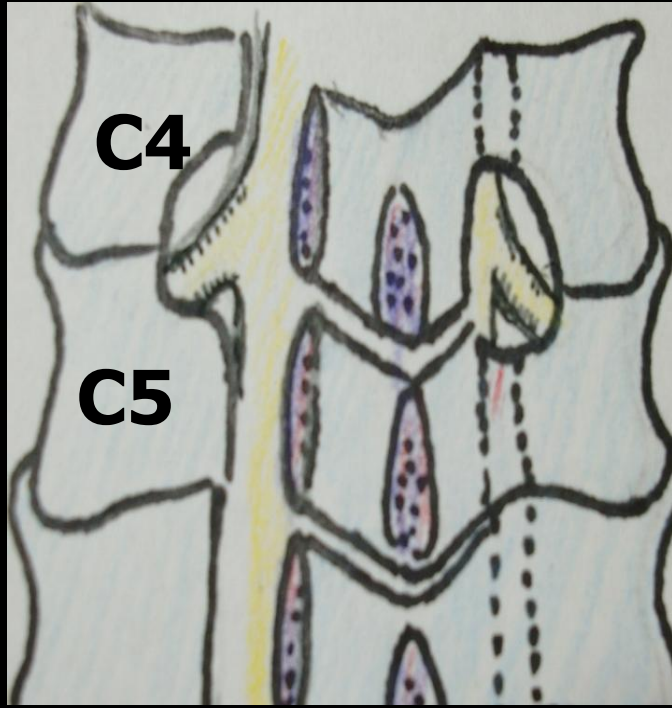
(83<sup>rd</sup> Japanese Orthopaedic Association 2010)



# Purpose

- To investigate the effectiveness of open-door laminoplasty with prophylactic C4/5 foraminotomy to prevent postoperative C5 palsy.

# prophylactic C4/5 foraminotomy

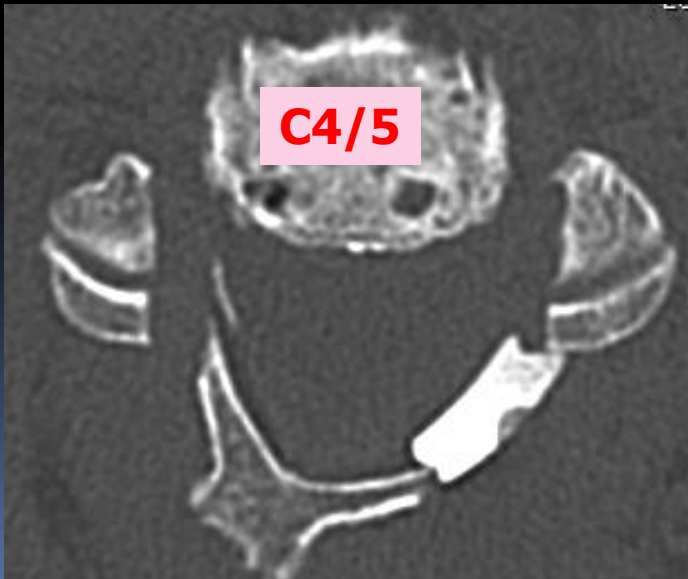


Using a 2mm diamond bur, and a micro sharp curette.

Bilateral C4/5 facets were removed until easy insertion of 1mm micro bone tip around C5 nerve root.

Remove bony elements only.

To prevent from hinge fracture, take care in excessive drilling of lamina.



# Material

2009~2010

**Consecutive 120 cases**

open-door laminoplasty

**with prophylactic bil. C4/5 foraminotomy**

(FG; foraminotomy group)

## **Exclusion**

- preoperatively deltoid muscle weakness (MMT  $\leq$  3)
- trauma, tumor
- laminoplasty from C5 and below

2007~2009

**150 cases without prophylactic bil. C4/5 foraminotomy**  
(NFG; non-foraminotomy group) as a control group

# Demographic data

		FG	NFG	p
<b>Cases</b>		<b>120</b>	<b>150</b>	<b>—</b>
<b>Follow-up (month)</b>		<b>8.2(1-17)</b>	<b>16(1.5-32)</b>	<b>&lt;0.05</b>
<b>Sex</b>	<b>male</b>	<b>92</b>	<b>103</b>	} <b>n.s</b>
	<b>female</b>	<b>28</b>	<b>47</b>	
<b>Age at op.</b>		<b>64</b>	<b>65</b>	<b>n.s</b>
<b>Diagnosis</b>	<b>CSM</b>	<b>36</b>	<b>59</b>	} <b>n.s</b>
	<b>CSMR</b>	<b>60</b>	<b>71</b>	
	<b>OPLL</b>	<b>24</b>	<b>20</b>	

# Methods

C5 palsy: deltoid muscle weakness MMT $\leq$ 3

## Evaluation between the 2 groups

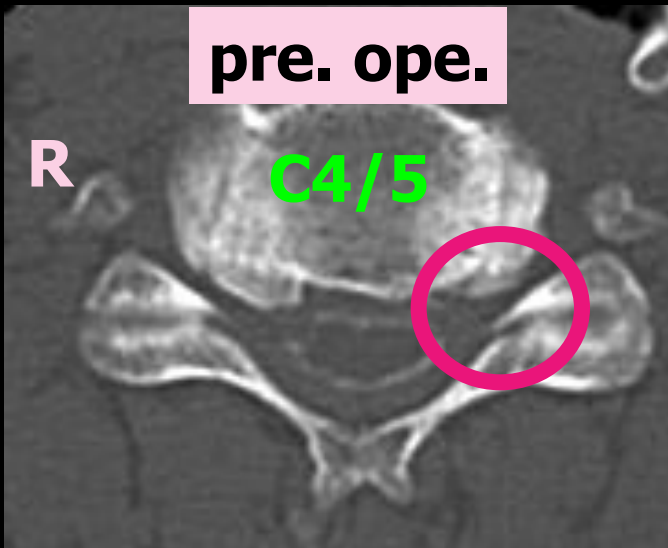
- incidence of C5 palsy
- operation time
- blood loss
- number of decompressed laminas

# Result

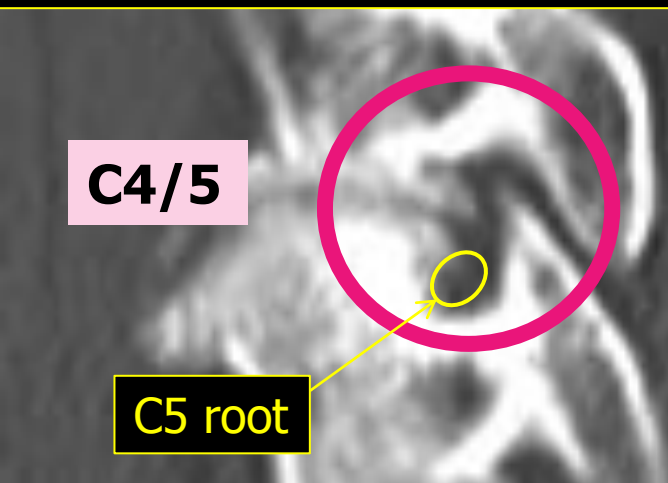
	<b>FG</b>	<b>NFG</b>	<b>p</b>
<b>incidence of C5 palsy</b>	<b>2/120 (1.7%)</b>	<b>12/150 (8%)</b>	<b>&lt;0.05</b>
<b>Ope. time (min)</b>	<b>130 (69-243)</b>	<b>106 (37-243)</b>	<b>&lt;0.0001</b>
<b>Blood loss (g)</b>	<b>225 (4-932)</b>	<b>246 (13-1308)</b>	<b>n.s</b>
<b>N. of decompressed laminae</b>	<b>3.3 (1-5)</b>	<b>3.2 (1-6)</b>	<b>n.s</b>

# Case presentation

53 year-old male, CSMR

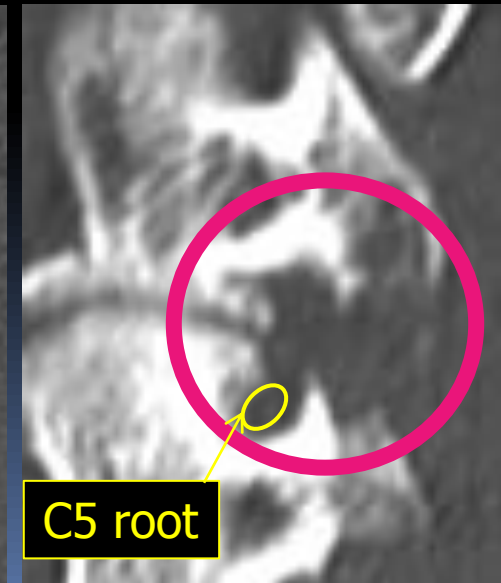
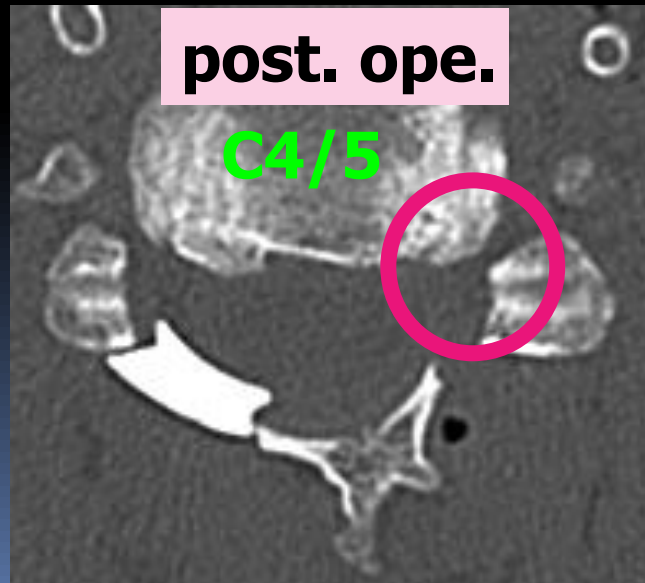


**C4/5 foraminal Stenosis (subclinical)**



three days after surgery  
shoulder pain(-), hinge side  
MMT ; Delt (2), Biceps (4)

Insufficient  
decompression?



# Discussion

## ● Reports of prophylactic foraminotomy

➤ Bil. C4/5/6 partial foraminotomy

**C5 palsy** : 1/162 (0.6%) (Komagata et al, 2003)

➤ C4/5 open side foraminotomy

**C5 palsy** : 16/773 (2.0%) (Ito et al, 2007)

Decreased the incidence of C5 palsy, but no prospective reports for prophylactic bil. foraminotomy.

# In the present study

Prophylactic bilateral C4/5 foraminotomy  
decreased C5 palsy.



Main etiology of C5 palsy is the tethering effect of  
C5 root induced by existent C4/5 foraminal stenosis.

2 cases encountered the C5 palsy despite  
undergoing prophylactic foraminotomy

- Spinal cord injury?
- nerve root irritation during surgery?
- Insufficient decompression of C4/5 foramen?

# Conclusion

- We investigated the effectiveness of prophylactic C4/5 foraminotomy to prevent postoperative C5 palsy.
- The incidence of C5 palsy decreased to 1.7% compared to the control group (8.0%).
- The results suggest that main etiology of C5 palsy is the tethering effect of C5 root induced by foraminal stenosis.
- Prophylactic foraminotomy is an effective measure to prevent from postoperative C5 palsy.