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Discal Cyst Associated with Myxoid Change and Apoptosis of Herniated Disc Materials

A Case Report

Kyoji Okada[1], Hajime Saito[2], Jun Nishida[3],
Naohisa Miyakoshi[1], Shu Takahashi,[1], Hiroyuki Nagasawa,[1],
Norio Suzuki[1], Shuichi Chida[1]

[1]*Department of Orthopedic Surgery, Section of Neuro and Locomotor Science, Akita University School of Medicine, Akita-city, Akita, Japan,* [2]*Saito Orthopedic Clinic, Akita-city, Akita, Japan,* [3]*Iwate Medical School, Department of Orthopedic Surgery, Morioka-city, Iwate, Japan*

Abstract

Discal cyst is a lumbar intraspinal cyst communicating with intervertebral disc, and previously reported series described the wall of these cysts as consisting of dense fibrous connective tissue. We report a 29-year-old Japanese male with discal cyst showing unusual histological features. Clinical symptoms in the current case as well as imaging features including discography were similar to those previously reported. However, the wall of the cyst consisted of disc material with myxoid degeneration. In addition, apoptosis of chondrocytes was diffusely observed in the herniated disc material. The current case was considered a histological variant of discal cyst. Myxoid degeneration of herniated disc material with diffuse apoptotic change of chondrocytes was probably associated with the formation of discal cyst.

Intraspinal cysts with a distinct connection to the corresponding intervertebral disc has been called discal cyst [1]. To clarify the location of this lesion, Coscia and Broshears in 2002 introduced the term "intracanalicular discal cyst" [2]. In the largest series of this condition, Chiba et al. reported that the wall of the discal cyst consisted of dense fibrous connective tissue [1]. We recently encountered a case showing typical clinical and imaging features of discal cyst, but its histological findings differed from those of previous reports. This study describes a case showing unusual histological features of discal cyst, and discusses its pathogenesis. All protocols were accepted by the Institutional Review Board at our institution. Informed consent was obtained from the patient.

Case report

A 29-year-old Japanese man visited our outpatient clinic in November 2000 with complaints of low back pain and right lower extremity pain, which occurred without identifiable causes. He experienced an aggravation of symptoms on walking.

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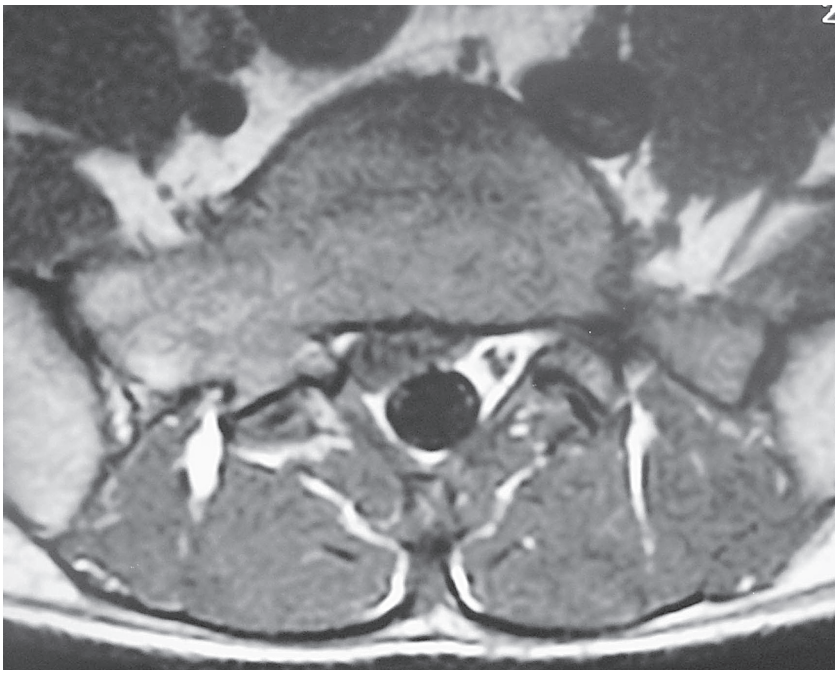

Figure 1-a. MR (magnetic resonance) images showed an extradural mass with isosignal intensity on T-1 weighted images at the upper vertebral level of the S1 vertebra.

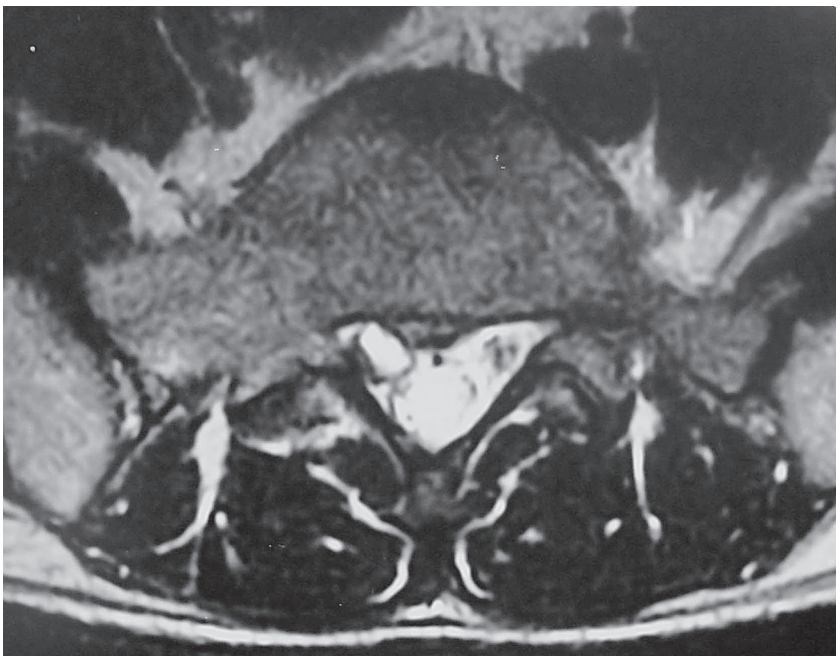

Figure 1-b. In T-2 weighted MR images, a round high signal area was observed within the mass.

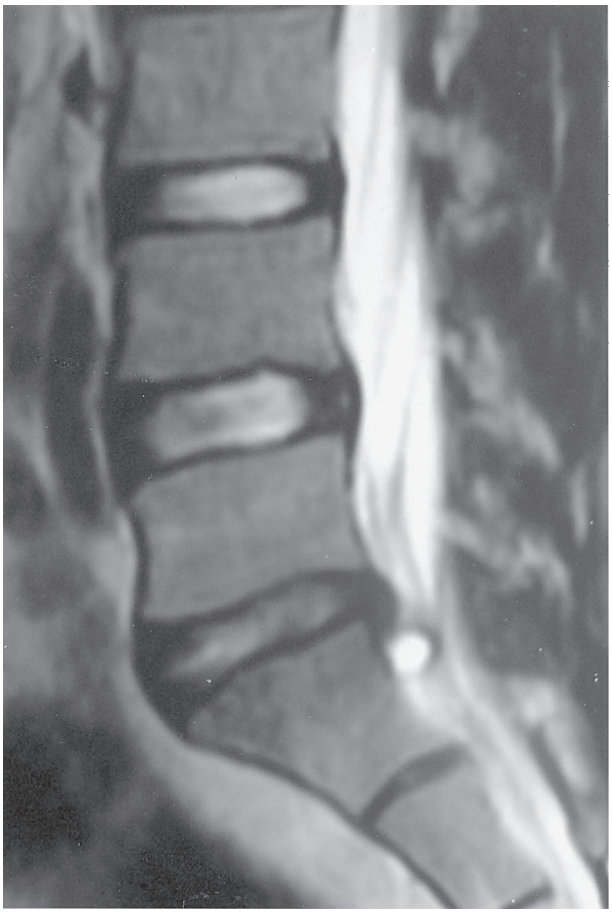

Figure 1-c. Sagittal T-2 weighted MR images showed the round mass with high-signal intensity behind the S1 vertebral body and mild disc degeneration at the L5/S1 level.

His past and family histories were not contributory. On physical examinations, movement of the lower back was markedly restricted. The straight-leg-raising test was positive at 30 degrees, and Bragard test was also positive on the right side. Achilles tendon reflex was negative on the right side, but sensory and all muscle strength of the lower extremity were normal. There were no apparent bladder and bowel disturbances.

Radiographs of the lumbar spine did not show any abnormality including narrowing of the intervertebral space. MR (magnetic resonance) images showed an extradural mass with isosignal intensity on T-1 weighted images at the upper posterior level of the S1 vertebra (Fig. 1-a). On T-2 weighted images, a round high signal area was observed within the mass (Fig. 1-b). Sagittal T-2 weighted MR images showed a round mass with high-signal intensity behind the S1 vertebral body and mild disc degeneration at the L5/S1 level (Fig. 1-c).

Discography showed a communication between the mass and L5/S1 disc. During the injection of contrast medium, severe radiating pain in the right lower leg was reproduced. CT discography confirmed communication between the mass and

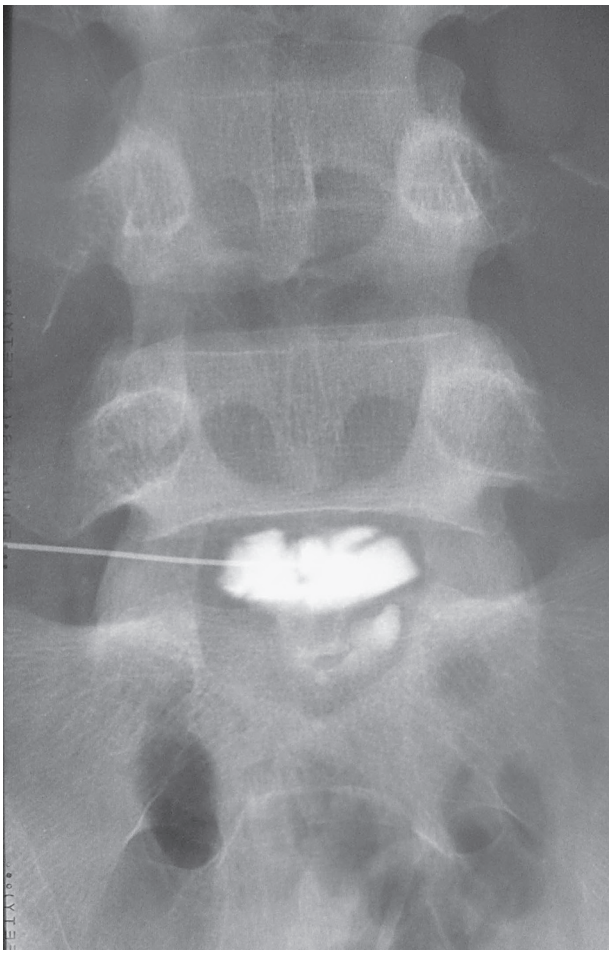

Figure 2-a. Discography showed a communication between the extradural mass and the L5/S1 disc.

L5/S1 disc (Fig. 2-a, b). Based on these findings, a diagnosis of discal cyst was made.

Since pain was severe, we performed surgery through a conventional interlaminar fenestration in December 2000. The downwardly migrated mass underneath the right S1 root was excised en bloc. Adhesion between the mass and the emerging nerve root was mild. After removal of the mass, a small fissure was seen on the bulging L5/S1 disc. His symptoms disappeared after surgery. At the recent follow-up in May 2006, he complained of mild, vague low back pain, but he has remained free of right lower leg pain.

Pathological findings

On gross findings, the lesion was dark red. Cut surface of the mass showed a myxoid-cystic area at the center with a small amount of red serous liquid. This cystic le-

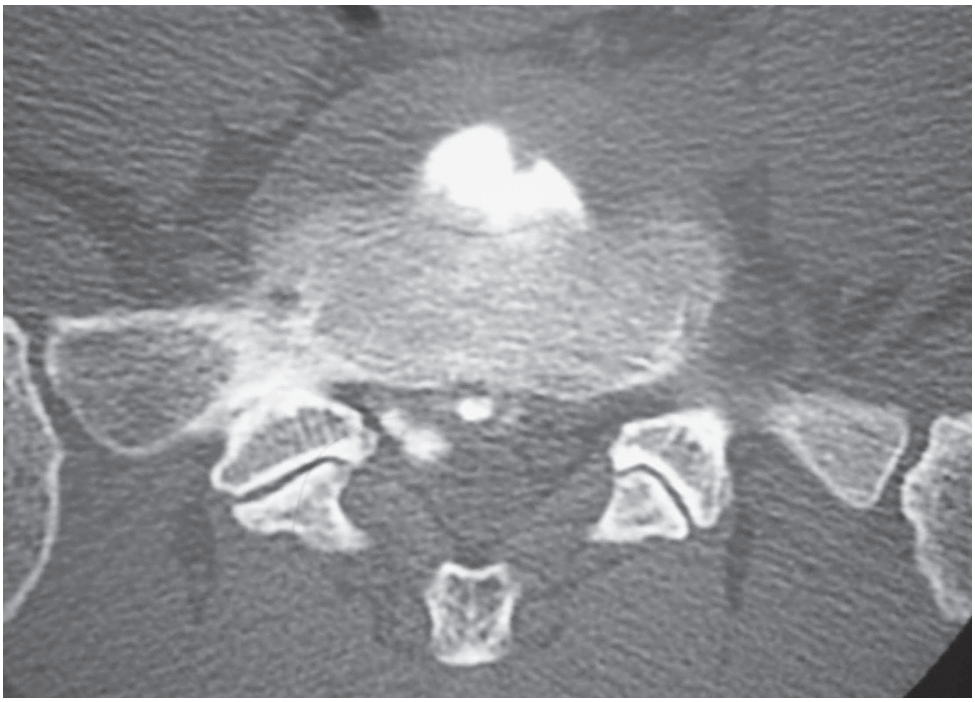

Figure 2-b. CT discography confirmed the communication between the mass and the L5/S1 disc.

sion was circumscribed by white-solid tissue. There was no apparent hemorrhagic change.

We reviewed the material on formalin-fixed, paraffin-embedded thin sections using hemtoxylin-eosin and Masson trichrome stains. In addition, serial sections were stained by the DNA nick end labeling method. On low-power views, a cystic space was observed at the center. There were no apparent lining cells on the inner surface of the cyst (Fig. 3-a). In the circumscribed tissue of the cyst, myxoid change was prominent in the lower portion (Fig. 3-b). The remaining cystic wall consisted of chondroid tissue with fibrillary stroma of disc materials (Fig. 3-c). In these chondroid tissue, many cells including chondrocytes were positive for the DNA nick end labeling method, showing apoptosis of the cells (Fig. 3-d). Apoptotic cells were observed more frequently in the outer area than in the inner area of the wall.

Discussion

Although the clinical and imaging findings were similar to those of the original description of discal cyst, histological features in the current case differed. In 2003, Chiba et al. reported the largest series of this condition and clarified its clinicopathologic profile [1]. Clinically, the discal cyst was characterized by

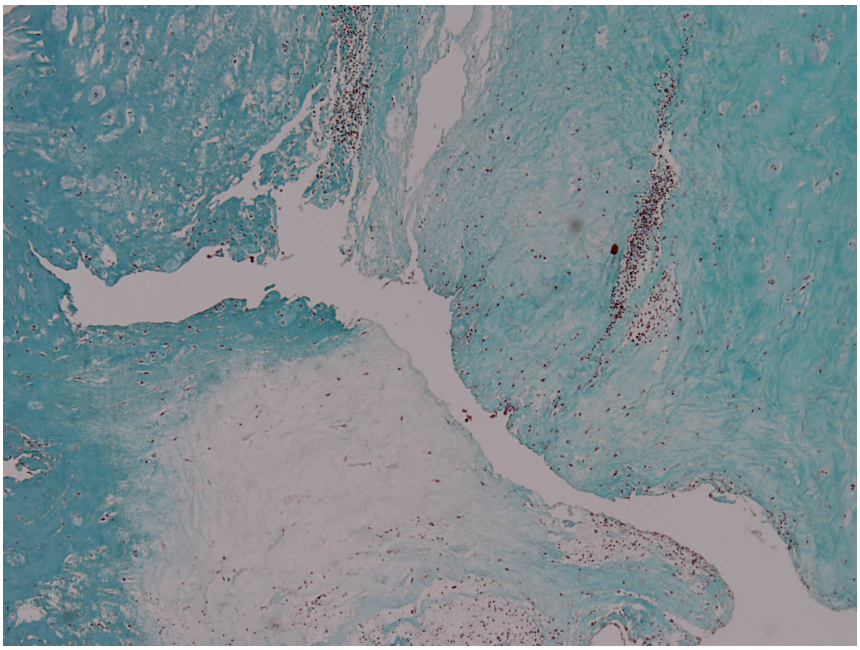

Figure 3-a. On low-power views, a cystic space was observed in the center. There were no apparent lining cells on the inner surface of the cyst wall. Please note the prominent myxoid area in its lower part (Masson trichrome, original magnification x 40).

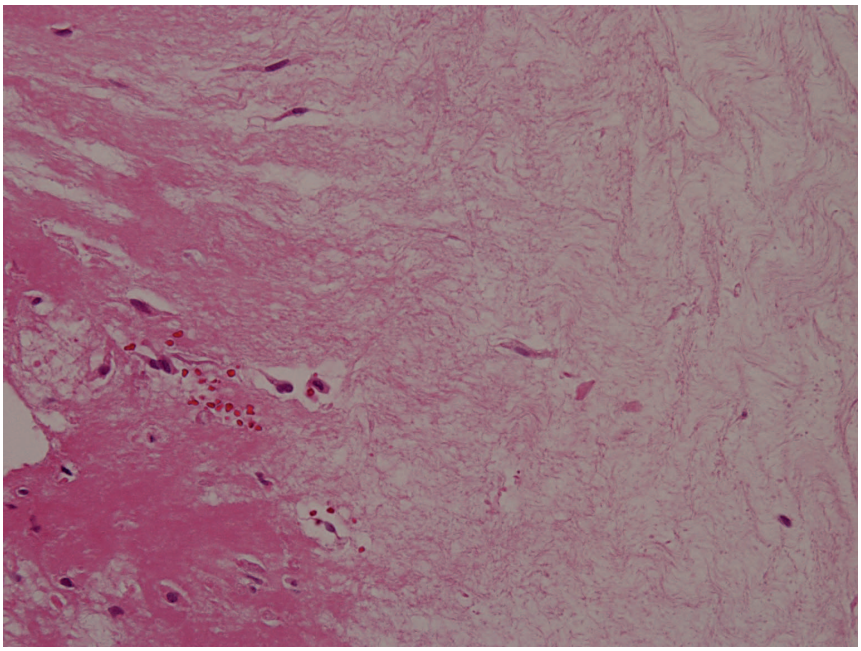

Figure 3-b. Microphotograph showing the transitional area of the cyst wall between the myxoid area and solid area (Hematoxylin and eosin, original magnification x 200).

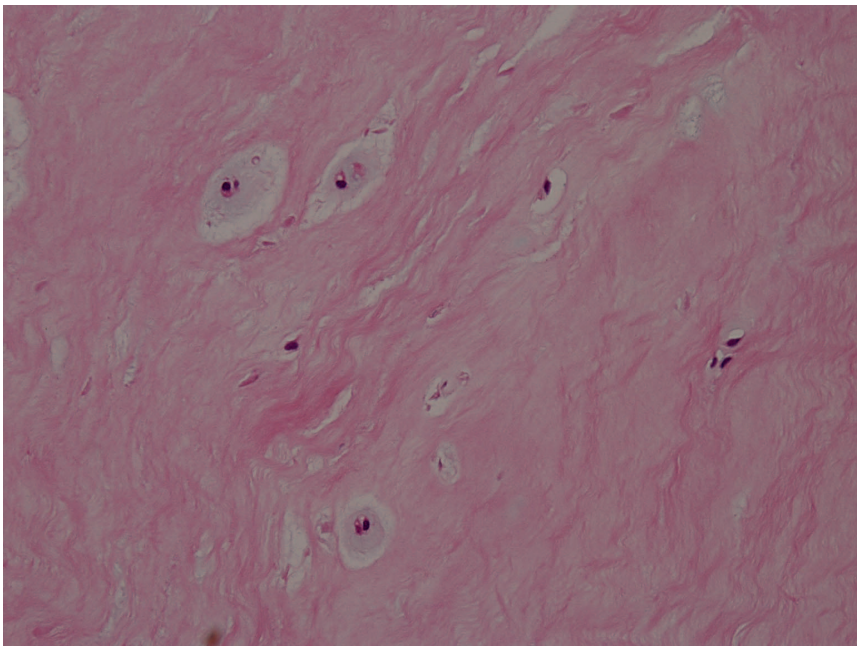

Figure 3-c. Microphotograph showing the remaining cystic wall consisted of chondroid tissue with fibrillary stroma of disc materials (Hematoxylin and eosin, original magnification, x 400).

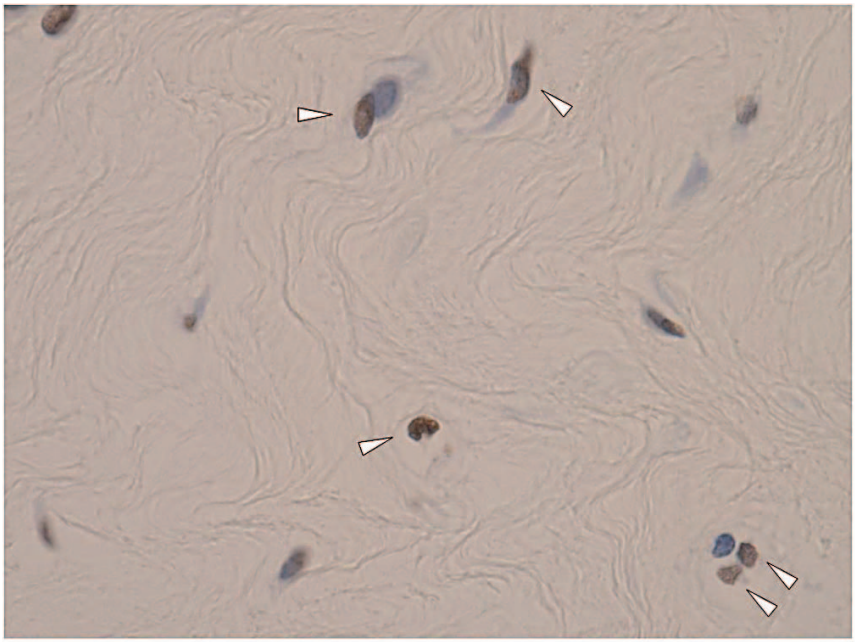

Figure 3-d. In the chondroid tissue, many cells including chondrocytes were positive by the DNA nick end labeling method (white arrow head), indicating apoptosis of the cells (original magnification, x 530).

unilateral single radiculopathy indistinguishable from disc hernia. A round cyst was connected to the corresponding disc, and this connection was confirmed by discography. They described that the cyst wall consisted of dense fibrous connective tissue containing bloody to clear serous discharge without any disc material. However, in the current case, the wall of the cyst consisted of herniated disc materials with myxoid degeneration and apoptotic chondrocytes. Since the clinical and imaging features were similar to but the histological features different from those of previously reported cases, we considered that the current case was an unusual form of discal cyst.

Another characteristic finding in our case was the annular defect found during the surgery. In the largest series, fissure on the peridiscal tissue was detected in only 2 (25%) of the 8 cases. Therefore, they mentioned that the development was less likely to be simply attributable to spontaneous regression of a prolapsed disc [1]. In the Japanese literature, Kyo et al. reported a case of discal cyst with annular defect of the corresponding disc, and Usui et al. described a case of discal cyst containing chondroid material in its cyst wall [3.4]. Recently, Tokunaga et al. reported two cases of discal cyst. They confirmed cartilaginous tissue in the cyst wall, and considered that the discal cyst might have developed from the absorption process of an intervertebral disc herniation [5]. We should stress that cystic change can occur within the herniated disc materials.

Apoptosis of chondrocytes was also characteristic in the current case. Apopototic cells were observed more frequently in the outer layer, and less in the inner layer of the cyst wall. The relationship between disc herniation and apoptosis of disc cells has been extensively studied [6,7,8,9]. Ariga et al. indicated that the number of apoptotic cells increased with age, resulting in a marked decrease in cell density and tissue disappearance or resorption [7]. In the myxoid area in the lower part of the cyst wall, disc cells including apoptotic cells were sparse in the current case. Myxoid area might be a transitional area before the formation of the cystic space. Since apoptotic cells are rapidly phagocytosed by adjacent cells [10], the cystic space in the current case may have been associated with resorption of these apopototic cells. Further investigation should be required to clarified a pathogenesis of cyst formation within the herniated disc material.

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Corresponding author:
Kyoji Okada, MD,
Department of Orthopedic Surgery,
Section of Neuro and Locomotor Science,
Akita University School of Medicine,
1-1-1 Hondo, Akita, 010-8543, Japan
E-mail: cshokada@med.akita-u.ac.jp,
Tel: +81-18-884-6148,
Fax: +81-18-836-2617