

Disc Displacement with Intermittent Lock: A Case Series of a Rarely-addressed Disorder

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ABSTRACT

Aim: We describe a series of five cases presented with disc displacement with reduction and intermittent lock (DDwRIL), from presentation to follow-up.

Background: Disc displacement with reduction with intermittent lock is a temporomandibular disorder in which the disc is displaced and reduced, along with temporary locking leading to limited opening. Due to the fact that it has only been recognized as a separate disease in 2013, there is no clear guideline on the management of these cases.

Cases descriptions: We present five cases of clinically established DDwRIL in different age groups. We walk through clinical presentation and diagnostic workup. Several modalities were used in the management of described cases from noninterventional management with counselling only to physical and splint therapies.

Conclusion: Disc displacement with reduction, with intermittent locking is a challenging temporomandibular disorder with risk to progress into disc displacement without reduction and hence necessitates a tailored approach and long-term follow-up.

Clinical significance: To our knowledge, this is the first case series reported on DDwRIL which provides detailed clinical presentation, examination, management, and discussion for orofacial pain practitioners as well as for future studies on this disease.

Keywords: Disc displacement, Intermittent locking, Orofacial pain, Temporomandibular disorders, Temporomandibular joint.

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BACKGROUND

Temporomandibular disorders (TMDs) represent a group of clinical diseases involving the temporomandibular joint (TMJ), masticatory musculature, surrounding bony and soft tissue elements, or combinations of these structures.¹

Traditionally, two types of internal disc derangement disorders were described: disc displacement with reduction (DDwR) and disc displacement without reduction (DDwoR).² Following the release of the new Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) in 2013, a third type has been reclassified as a separate disc disorder: disc displacement with reduction and intermittent locking (DDwRIL).³ In fact, DC/TMD defines DDwRIL as a true “mechanical” disk disorder in which patient history and examination reveal disc displacement with reduction along with occasional or frequent locking leading to a limited opening.³ Moreover, clinical findings in patients with DDwRIL include normal or almost-normal motion range interrupted with episodes of painful clicking resulting from disc “catching” or locking, which is heard as clicking or popping sound. These intermittent episodes are transient and characterized by pain and/or limitation in mouth opening.⁴ In addition, during locking, the jaw follows a “deviated” path on opening which may, or may not, be corrected at maximum opening, and accordingly be termed then as “deflection” rather than deviation in this article.

Despite having extensive reports in the literature on the diagnosis and management of disc displacement with and without reduction,⁵⁻⁷ there is very little evidence evaluating DDwRIL, not surprisingly since it was only recently considered a separate disease (2013 in DC/TMD), consequently, leaving it a poorly-understood entity on different levels.

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Furthermore, some authors consider that intermittent locking presents a transitional stage between DDwR and DDwoR.^{8,9} Moreover, some suggest that clenching may be a risk factor for developing DDwRIL.¹⁰ Eventually, several treatment modalities have been suggested ranging from no treatment to surgical approaches. Nevertheless, there is lack of clinical reports and studies on DDwRIL as a separate disease.

Consequently, due to the lack of available reports on DDwRIL, associated pain and disability, and the risk it poses on the potential worsening into a more morbid disease, DDwoR, special emphasis should be placed on this condition and its proper management for general practitioners, TMD experts and other healthcare professionals involved in orofacial pain.

Therefore, we describe a series of five cases of DDwRIL presented and managed in a private practice by a TMD specialist following a methodological approach. We describe the initial presentations with detailed examination, management approaches according to each patient, and disease state upon follow-up.

CASES DESCRIPTIONS

Case 1

A 15-year-old female patient present with a 6-month history of trauma to her middle face. History revealed healthy physiological and psychological profiles. However, she complained of “annoying noise” on mandibular movements. Examination revealed non-painful, unrestricted mouth opening with deviation to the right side while opening without clicking (Fig. 1A) and straightens on maximum opening (Fig. 1C). Seldom, she would show deflection instead to the right side accompanied with clicking. Given the clinical signs and symptoms, differential diagnosis included degenerative joint disease, DDwR and DDwoR.

Orthopantomogram (OPG) was done to screen for signs of degenerative changes, yet revealed normal condyles and no radiological changes. Therefore, magnetic resonance imaging (MRI) was performed in order to reach conclusive evidence. As a matter of fact, MRI revealed anterior disc displacement (ADD) in closed-mouth position (Fig. 2A) and, interestingly, lock in intermediate-opening (Fig. 2B), and normal reduced disc position on opening (Fig. 2C). Figure 2B is of special interest as it is relatively rare to capture lock in DDwRIL during MRI.

Therefore, given all of the preceding, especially the evident lock on MRI, a diagnosis of DDwRIL was established.

As a result, patient’s management consisted of counselling, occlusal splint and daily physiotherapy (especially exercising opening and closing mouth in protrusion).

Follow-up after 23 months revealed almost total resolution of mandibular deviation on opening, and patient reported disappearance of the noises (Fig. 3).

Case 2

A 24-year-old female patient was referred by her general dental practitioner after noticing irregular dynamic jaw movements. Examination revealed an otherwise-normal patient except for

signs of clenching, further supported by the observation of tongue crenulations and localized pain elicited upon palpation of the masseter bilaterally, with increased tenderness on the left side. On opening, her mandible deviated to the left side without clicking (Fig. 4B), along with occasional deflection to the left side with clicking sound.

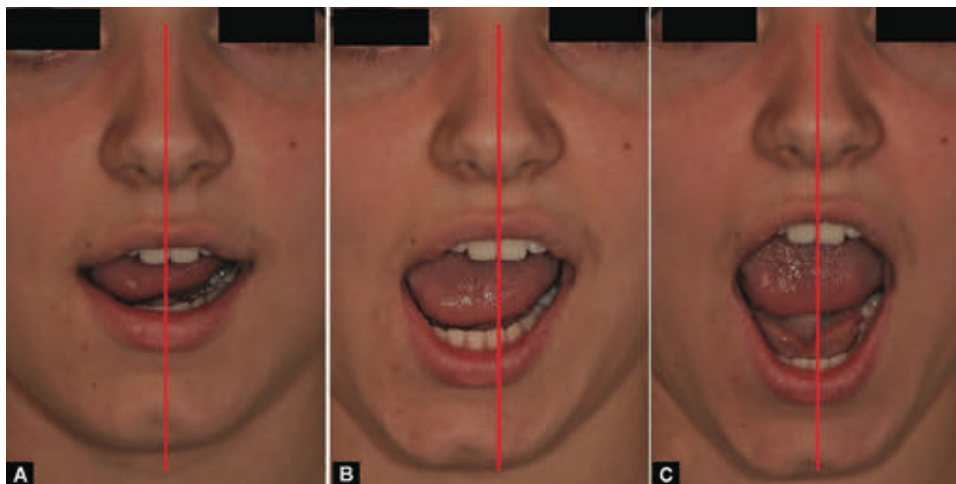
This case presents a combination of myogenous and true disc diseases. Therefore, a clinical diagnosis of localized myalgia in the masseter body was made, and differential diagnosis of the disc disease mainly included DDwR and DDwoR. However, since clicking was not constant and no pain or functional limitation were there, a clinical diagnosis of DDwRIL was made; eventually, patient management consisted of counselling, with physical therapy and behavioral treatment to address the localized myalgia and and follow-up.

During follow-up 7 months later, the patient returned with worsening of disease with tendency toward DDwoR: she described multiple episodes of displacement without reduction. She reported not following the prescribed instructions. On examination, there was difficulty to perform lateral movements of her jaw, with much frequent deviation compared to deflection, which only appeared when assisted opening was attempted. As clinical presentation was clear, no radiography was needed. Counselling and instructions were provided again with emphasis on the necessity of compliance. The patient was given physical exercises and splint was planned following the end of the orthodontic treatment.

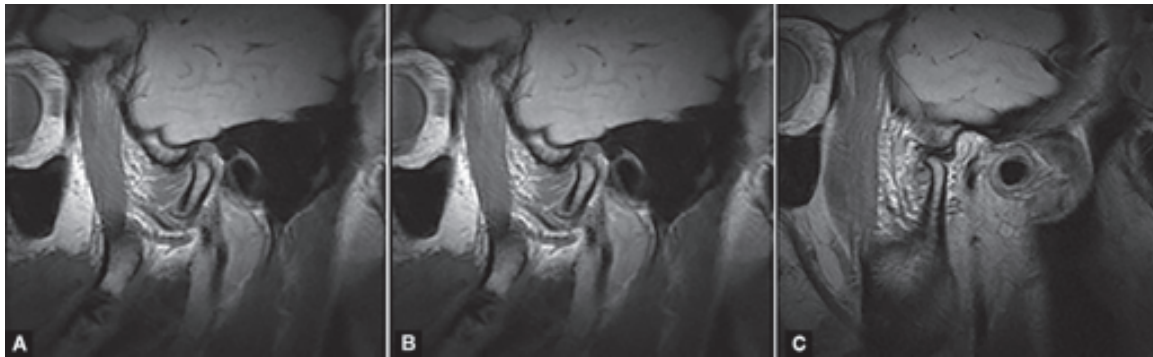
Case 3

A 40-year-old male patient with signs of TMD was referred by her general dental practitioner for proper diagnosis and management. Patient complained of episodes of locking and pain in the right TMJ on opening, especially after clenching or eating hard food, with clicking that may persist for several days. He reports auto-resolution of the symptoms immediately when he performs laterality movements. Patient history revealed nail biting as a parafunctional habit.

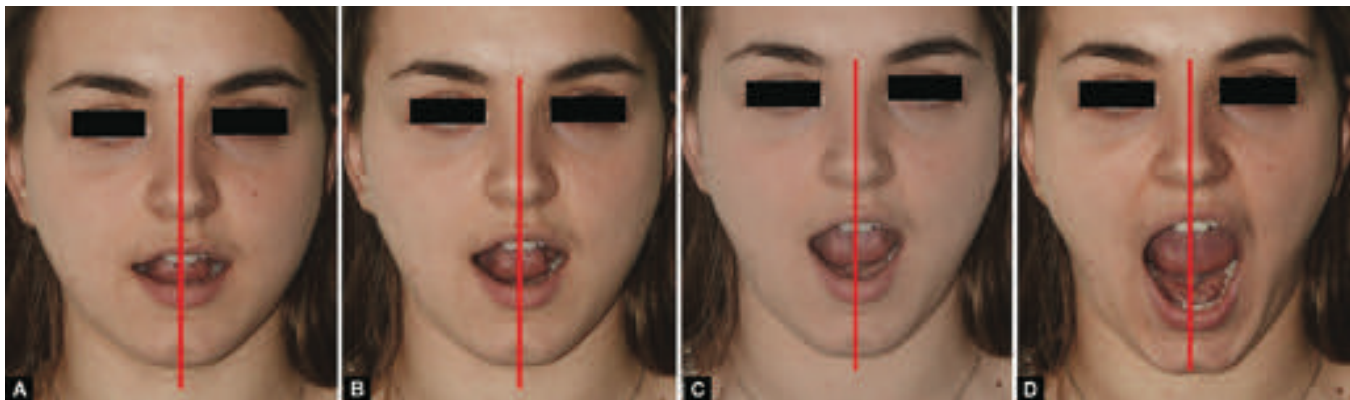
On examination, patient showed good unassisted maximum opening of 45 mm, but with deviation to the right side. Clicking manifested when opening was forced and aligned. Lateral movements were normal, and he complained of no pain on palpation.



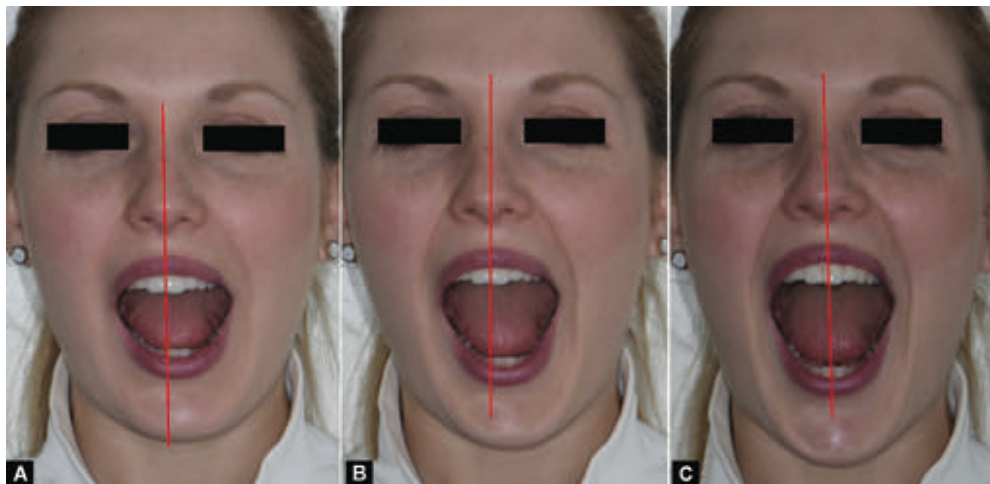
Figs 1A–C: Scheme of mouth opening in Case 1 showing (A) straight initial opening into (B) right-sided deflection in intermediate opening which corrects upon (C) maximum opening



Figs 2A–C: MRI of the right TMJ of Case 1 showing (A) anteriorly displaced disc in closed mouth position, (B) disc locked in intermediate opening position, and (C) physiological position in maximum opening



Figs 3A–D: Follow-up of Case 1 at 23-month revealing undeviated and comfortable mouth opening; (A) initial opening; (B) intermediate opening; (C) further opening; (D) maximum opening



Figs 4A–C: (A) Initial mouth opening in Case 2 showing (B) deviation to the left side before returning to central position when reached (C) maximum opening. Notice the visible crenulations on the sides of the tongue

History of occasional jaw lock episodes which resolve on lateral manipulation is indicative of disc displacement with reduction; similarly, assisted opening revealed clicking and jaw alignment also indicating disc displacement with reduction. Therefore, disc displacement with reduction with episodes of locking defines DDwRIL, and hence a clinical diagnosis was reached without the need for further workup.

Eventually, counselling was provided at the first appointment, and behavioral treatment was initiated. Furthermore, daily physical

exercises were instructed. After 3 months, patient presented with persistence of nail biting and decreased episodes of locking. Nevertheless, he showed motivation for behavioral therapy and nail biting cessation and was set for future follow-ups.

Case 4

A 45-year-old female patient presented with a chief complaint of clicking on opening and annoying discomfort in her right

pre-auricular region. She reported a history of right joint pain 2 months ago and denied any facial trauma. Upon examination, there was no pain; pre-auricular tenderness was replicated on joint palpation in closed state as well as on opening. Clicking was evident on opening with deflection to the affected side. Occasionally, opening became limited with deviation toward the right side.

Based on the findings of clicking on opening and deflection to the right side, DDwR of the right disc is suggested; moreover, the occasional limitation in opening and deviation to the right side leads to a clinical diagnosis of DDwRIL, with arthralgia with no radiological changes in the joint. Patient management consisted of counselling, physical therapy, and occlusal splint.

On a follow-up 12 months later, patient reported complete resolution of discomfort and pain episodes. She was instructed to continue as discussed.

Case 5

A 20-year-old female patient presented to our practice for orthodontic treatment. Her history revealed persistence of thumb-sucking habit till 6 years of age, and the extraction of 36 and 46 when she was 8 years old.

Physical examination revealed right TMJ clicking on opening, with frequent deviation and occasional deflection to the right side (Fig. 5). The patient was asymptomatic. No further clinical findings were apparent.

A provisional diagnosis of DDwRIL of the right TMJ was established. MRI was performed to inspect right disc displacement and revealed "partial" anterior right disc displacement in closed-mouth position (Fig. 6A). On opening, normal disc position was noticed (Fig. 6A). With regard to the left disc, the MRI surprisingly showed complete anterior disc displacement in the closed position that was reduced to normal disc on opening (Fig. 6B).

Since the patient was asymptomatic, only counselling was provided. Orthodontic treatment was initiated to address the aesthetic complaint, and follow-up along the course of the orthodontic treatment revealed no change in patient's disease state.

DISCUSSION

The disc-condyle complex derangement comes from the alteration of the relation of the disc on the mandibular condyle.¹¹ Disc displacement disorders comprise a group of TMD in which the temporomandibular disc escapes its position between the temporal

and mandibular condyles and displaces anteriorly, medially, laterally or even posteriorly to the mandibular condyle.³

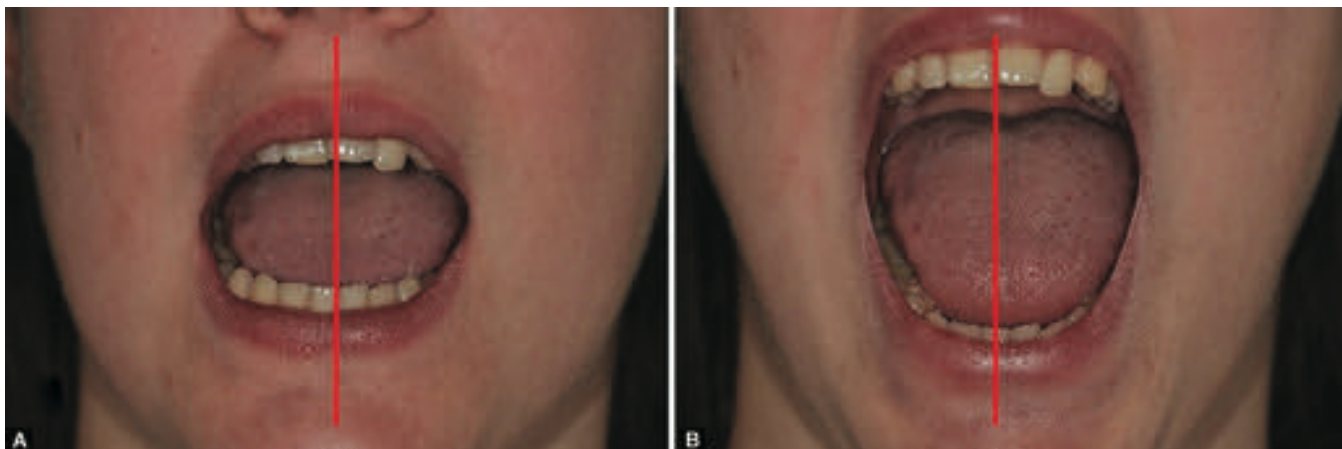
Indeed, DDwR and DDwRIL share a variety of similar signs as joint noises and clicking on opening and/or closing, but with intermittent locking, pain may be present, along with essentially a locked jaw that requires lateral manipulation to reduce into normal position.³ In fact, Kalaykova et al. prospectively followed patients with anterior disc displacement with reduction over the course of 2 years. Their sample was divided into 2 groups, those with intermittent locking and those without. The authors concluded that DDwRIL may develop to DDwoR. They observed moment of disc reduction (MDR) on MRI along the study period and noticed that in patients with DDwR, MDR remained unchanged along time, while in DDwRIL clicking decreased significantly or totally, usually without symptoms of permanent lock, but the disc was still displaced with partial or no reduction at all.¹² In addition, Poluha et al., Wilkes et al., Yamaguchi et al, and others suggest that DDwRIL can be a precursor to DDwoR.^{4,11,13} This confirms that the course of development of DDwRIL is different from regular DDwR disease.

In one study, Kalaykova et al. showed that diurnal clenching may be a risk factor for developing DDwRIL.¹⁰ In another study, Lee et al. showed evidence suggesting that sleep bruxism may contribute to the development of DDwRIL.¹⁴ Moreover, a different study also conducted by Kalaykova et al. suggested that masticatory forces may cause temporary intermittent lock; they compared MDR between group of anterior DDwR and another group of anterior DDwRIL following chewing and noted that the DDwRIL group suffered from increased MDR.¹⁵ This may partially explain the aetiology behind the disease in Cases 2 and 3. In Case 2, the patient showed significant signs of clenching, and in Case 3, patient complained of lock notably after clenching or eating hard food and reported that clicking would persist for several days afterwards. Moreover, he had chronic nail biting since years, which may, or may not, contribute to the disease.

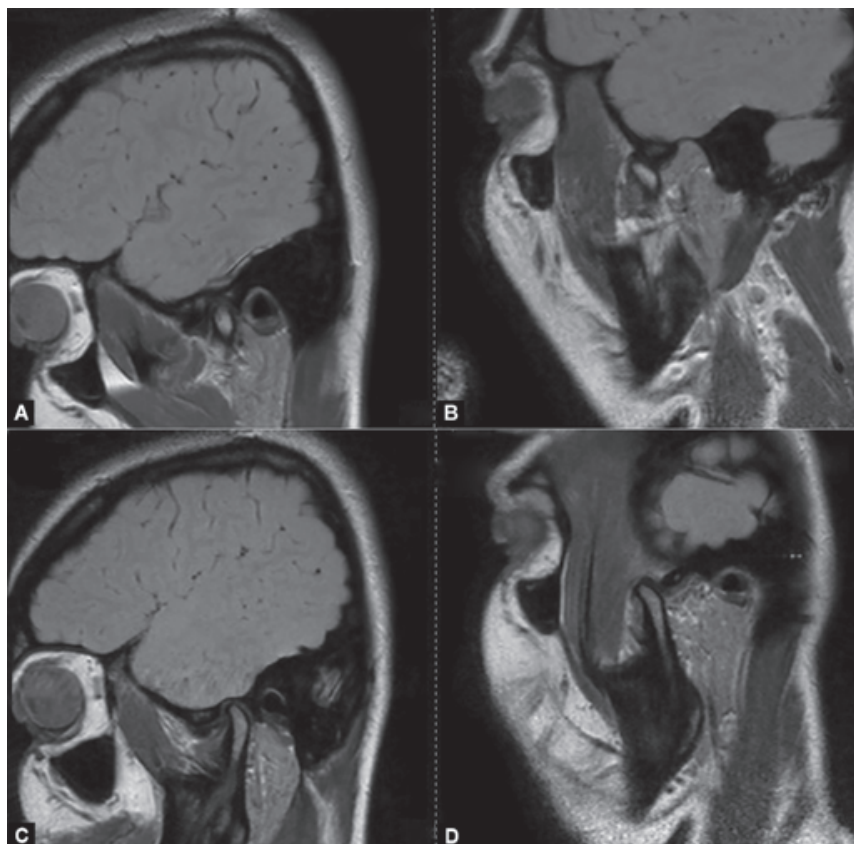
Case 5 presents a unique situation in which there exists bilateral disc displacement with reduction, with partial intermittent displacement on the right side and total displacement on the left side. However, signs were mainly apparent in relation to the right joint.

In most of the cases, patients did not complain of pain. When history and clinical examination are inconclusive, MRI may be of great aid in observing the disc in several positions.

Regarding treatment of DDwRIL, several options have been suggested. Starting from the least sophisticated and expensive



Figs 5A–B: (A) Right-sided mandibular deflection correcting upon (B) maximum opening of Case 5



Figs 6A–D: MRI of both left and right joints of Case 5. Note (A) the partial anterior displacement of the right disc with (B) normal position in the opening state, and the (C) total anterior displacement of the left disc with (D) normal position in the opening state

modality, Minagi et al. and Yamaguchi et al. suggest that if DDwRIL patients learn to guide disc reduction by following the opening of least resistance, and mainly lateral movement, they can significantly decrease the risk of progression into DDwOR.¹⁶ This was effective in Case 3 where the patient used lateral movements to unlock the jaw and who showed improvement 3 months later. In the presence of any parafunctional habit, the patient should be guided toward suspending that habit. Clenching may present additional problem, but patients with DDwRIL and clenching would benefit from occlusal splint therapy.

Counselling and cognitive behavioral treatment are essential in any conservative approach; as psychological factors are main players in larger amount of cases, cognitive behavioral therapy may be very helpful in cessation of the contributing oral habit as well as clenching. Physical exercises remain an intrinsic factor for muscular function and hyperfunction. All patients are supplied with physical exercises that need to be done on a daily basis; furthermore, Other treatment options may include invasive procedures, medication (anti-inflammatory drugs, muscle relaxants, and antidepressants), physical therapy, hypnotherapy (as another behavioral treatment approach or cognitive behavioral hypnotherapy), and others.^{2,8,17,18}

Taking into account the few available studies on DDwRIL along this series of clinical reports, new studies can better be designed to address the uncertain aspects of the disease and questionable nature; furthermore, since, to our knowledge, no literature studied the management modalities for this disease, this report may provide a starting point for a standardized treatment or management approach.

CONCLUSION

Disc displacement with reduction with intermittent locking is a difficult and challenging TMD affecting the quality of life of patients. Furthermore, this disease holds the high possibility of progressing into disc displacement without reduction. Therefore, this brings about the necessity for thorough analysis and proper management, with special emphasis on conservative and reversible treatment options and long-term follow-up. Given the lack of studies on the management of such disease, this clinical report may present a simple guide for clinicians; more specifically, this paper would assist clinicians in the management of such cases by highlighting main features and signs to look for, and provide a starting point for experimental studies on this entity

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