A common presentation of acute juvenile cervical torticollis (AJCT) in the chiropractor’s office is a young patient experiencing a painful sternocleidomastoid (SCM) spasm of short duration which usually resolves rapidly after initiation of treatment. Cause of the spasm can be due to an atlantoaxial rotatory fixation (AARF), a potentially serious condition, or muscular and/or ligamentous etiology (1). Although AJCT is a condition that commonly presents in the office, information in the chiropractic and medical literature is grossly lacking. In addition there is a great deal of confusion as to the etiology, risk factors, diagnosis and treatment. For the purpose of this paper cervical dystonia, a poorly understood neurological condition will be excluded (2). All prevention and risk factors noted in this monograph have been assigned a “C” strength of recommendation since all are a result of consensus, practice tradition or very limited observational studies.

**RISK FACTORS AND PREVENTION STRATEGIES**

1. **Age (C):** Children have several anatomical differences from adults. It has been suggested by several authors the combination of ligamentous laxity, steeper dens facet angles and synovial folds between the facets of CO/1 and C1/2 predisposes children to developing AARF which results in AJCT (3-5). Battiatata et al state that 68% of patients are under 12 years old and 90% are under 21 (6).

2. **Trauma (C):** Trauma has been reported as an initiating factor in AARF (7). In a small observational study Subach et al reported 20% of AARF patients had a history of trauma (8).

3. **Infection (C):** Subach et al also stated 35% of the patients in their study had a history of recent infectious illness to include pharyngitis, otitis media and viral upper respiratory infection (8). This presentation is commonly referred to as “Grisel's Syndrome” (9).

4. **Spinal instability (C):** Karkos et al reported in their 2007 systematic review that any syndrome associated with spinal instability places the patient in a high risk group. These conditions included Down’s syndrome, Kippel-Feil syndrome, osteogenesis imperfecta and neurofibromatosis (10)

4. **Cold draft (C):** Spasm of muscular origin can be caused by sleeping under a ceiling fan or exposing the neck to a cold draft according to some experts. It is thought to trigger SCM spasm through activation of trigger points (11).
5. **Emotional overlay (C):** Some practitioners have noted a relationship between emotional stress and onset of AJCT (12).

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(11) Kleinfield S. 4-13-0009. Ref Type: Personal Communication

(12) Davis C. 4-29-2009. Ref Type: Personal Communication
Acute juvenile cervical torticollis (AJCT) is more of a descriptive term than a diagnostic term. For the purposes of this monograph AJCT will be used to describe the young patient that presents in acute pain with head tilt and cervical rotation that responds rapidly to care. The reader should be cautioned there are several variations of AJCT that can have life threatening or long term consequences. Bredenkamp and Maceri state “nearly 80 entities have been associated with torticollis” (1). Several of these entities, which may manifest as torticollis, represent serious conditions which must be ruled out. Just a few of the conditions which have been identified in the literature are retropharyngeal abscess (2), bacterial meningitis (3), fracture (4;5), neoplasm (6) and cervical dystonia (7). The scientific literature also has several different terms to describe variations of torticollis. Among these are atlantoaxial rotary subluxation (AARS) (8), atlantoaxial rotary fixation (AARF) (8), acquired torticollis (9), inflammatory torticollis (1), acute torticollis (10), Grisel's syndrome (11) and muscular torticollis (MT) (12).

After more serious pathology has been ruled out the reader should be aware of AARF which often presents as a simple MT. AARF is a relatively rare, poorly understood, but potentially serious form of torticollis. Just as in MT, response to treatment is usually rapid. However if response is delayed, the outcome can result in long term symptoms (13;14) and may require surgical intervention. Karkos et al in their systematic review stated 15% of these patients may develop significant neurological sequelae (11).

Grading of AARF (15)
Type 1: Rotary fixation without anterior displacement
Type 2: Rotary fixation with anterior displacement of 3 to 5 mm (in the adult)
Type 3: Rotary fixation with anterior displacement of over 5 mm
Type 4: Rotary fixation with posterior displacement

It should be noted all the evidence for AARF or MT is based on case studies or case series. There are no RCT’s or case controlled studies available.

**CLINICAL TESTING**

1. **Clinical signs (C):** According to most authors there is a distinction between AARF and MT arising from spasm of the sternocleidomastoid (SCM) (15;16). AARF is considered uncommon and has the potential for long term disability. It is characterized by spasm of the SCM on the side to which the head is rotated with head tilt to the opposite side, the “cock robin” position. An example for this presentation would be right rotation, left lateral flexion with spasm in the right (long) SCM. When spasm of the SCM is present on the side opposite to head rotation (short SCM) it is indicative of MT due to spasm. An example for MT would be right rotation, left lateral flexion with left (short) SCM spasm (12;17). Additionally the inability to rotate the head past midline away from the direction of rotation is indicative of AARF (8).
2. **History (C):** Subach et al reported 75% of patients in a retrospective study diagnosed with AARF had a recent history of upper respiratory illness, traumatic injuries or head or neck surgery (8).

3. **Sudeck’s Sign (C):** Although the confirming evidence in the literature is lacking, Sudeck’s sign is considered pathognomonic or at least strongly indicative of AARF by some experts (18). This sign is described maintenance of the neutral position or rotation of C2 in the direction of cervical rotation rather than in the opposite direction (8;19;20). Additionally a tender C2 spinous process may be considered an indicator of AARF (11;21).

4. **Imaging (C):** When AARF is suspected plain film x-rays and follow-up CT scans within two weeks (22), if improvement is not rapid, are considered the standard of care (8). Due to patient non-compliance and technique difficulties, it is often difficult to visualize C1/C2 on plain films (22). When an acceptable image is possible, an offset of the lateral masses of C1 is a possible indicator of AARF (12). Crook and Enyon disagree. They state plain film x-rays can detect rotary fixations 93% of the time. They describe the finding as “persistent asymmetry of the odontoid peg in relation to the lateral masses, uncorrected by head rotation”(23). The majority of authors recommend CT scanning, with dynamic scans preferred (8;12;24).

Subach et al identifies three clinical features to distinguish AARF from simple MT. They are palpation of the spinous process of C2 in the direction of cervical rotation, spasm of the SCM (long) on the side of rotation, opposite the side of head tilt and lastly the inability to rotate past midline in the direction opposite the side of injury (8).

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(4) Novotny JJ. It'S all in the history. COMSIG Rev 1993 Nov 1;2(3):68-70.


There are possible severe consequences for a missed or delayed diagnosis in acute juvenile cervical torticollis (AJCT). The ability to eliminate other causative factors and to distinguish between atlantoaxial rotation fixation (AARF) and simple muscular torticollis (MT) is of paramount importance. The reader is advised to review the monograph on diagnosis to avoid possible long term morbidity in the patient.

Unfortunately all studies related to the treatment of AJCT are case series, case reports or expert opinion. Consequently no intervention whether it is conservative, pharmaceutical or invasive can earn more than a “C” rating for strength of evidence.

CHIROPRACTIC AND OTHER CONSERVATIVE TREATMENT

1. **Cervical traction (C):** Simple traction in a variety of forms appears to be an almost universal intervention for both MT and AARF. Manual traction (1), mechanical traction (2) halter traction (3-5), skull traction (6), traction under sedation (7) and hanging head traction (8) have all been reported. The hanging head method utilizes a table that has tilt capabilities. The procedure is described as placing the patient supine, head down position (20 degrees tilt) while the pelvis is supported to prevent sliding. The patient is left in this position for 5 to 10 minutes. The weight of the head provides the distractive force. The author reports the patient is usually pain free after this procedure with no additional care necessary. An interesting note relating to manual traction was provided by Obersteadt who mentioned after manual traction the patients head is always returned to the antalgic position prior to releasing pressure (9).

2. **Cervical collar (C):** Most of the literature reports placing the patient, for 1 to 6 weeks, in either a soft cervical collar (1;10;11) or rigid cervical collar (5;7;12) after reduction of AARF. The literature is less specific relating to MT.

3. **Spinal manipulation (C):** Spinal manipulation has been reported as a treatment method for AJCT. Although most published evidence in the literature is limited to adult cases (13-15), there is one published case report of a child with AARF which included spinal manipulation in conjunction with light massage and trigger point therapy (16). A second case report diagnosed as MT was treated with success using light force Activator technique and gentle joint mobilization (17). Chiropractic physicians commonly utilize spinal manipulation for MT for children as reported in personal correspondence. Treatments are gentle (2) and sometimes delayed to a second visit (18). Spinal manipulative treatment has also been mentioned in the literature for AARF as manipulation under anesthesia (19).

4. **Acupuncture (C):** A case series of 18 patients, 3 which were under 18 years old, demonstrated improved range of motion after a single treatment. Acupuncture points used were on the ipsilateral hand of the side of rotation at SI-3 and M-UE-24 (20).
5. **Other interventions (C):** Several other interventions have been reported. These include moxibustion (21), electrotherapy (22) infrasonic sound therapy (18) and spray and stretch (23).

Similar to conservative treatment, pharmaceutical and invasive treatments have only limited evidence for efficacy. No controlled trials or quasi-experimental studies were located. Generally the allopathic physician initially utilizes some form of traction followed by muscle relaxants and/or anti-inflammatory medications. Surgical interventions are utilized in extreme cases.

1. **Traction (C):** Although halter traction and mechanical traction are usually utilized (4;12;24) for AARF, caliper and halo traction use has also been reported (5;25).

2. **Pharmaceuticals (C):** Use of muscle relaxants and anti-inflammatory medication are a common intervention for AARF. These are given intramuscularly (1), intravenously (4) and orally (10).

3. **Manipulation under anesthesia (C):** Two case studies reported improvement in 2 patients with AARF that did not respond to conservative treatment (19;26)

3. **Surgery (C):** Surgical intervention (5;12;27) is limited to those patients with AARF who do not respond to conservative or pharmaceutical care. Subach et al reported of 15 patients in their case series, 1 required posterior atlanto-axial fusion (12). Fusion of CO-C1 or C1-C2 will result in the permanent loss of 50% of cervical rotation (28).

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(18) Hillyer M. Cervical torticollis. 2-10-2009. Ref Type: Personal Communication


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