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The Use of Acupuncture in a Pediatric Chronic Care Setting: Clinical Applications

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ABSTRACT

Background: Children with disabilities have a complex array of distressing symptoms that decrease their quality of life. Many of the mainstays of modern biomedicine can also impose significant side-effect burdens on patients and their families. There has been a paucity of studies examining acupuncture for reducing the symptom burden on these patients.
Materials and Methods: This retrospective case series highlights patients referred for acupuncture or palliative care at Gillette Children's Specialty Healthcare, St. Paul, MN. In the past year, 52 unique patients received 136 acupuncture treatments in the clinic or hospital setting. Patients received treatments based upon their backgrounds and presenting complaints along with energetic work, biomechanical treatment (surface release technique, percutaneous electrical nerve stimulation), and/or auriculotherapy.
Results: This case series highlights how 9 of the 52 patients with a variety of presentations received benefits from acupuncture.
Conclusions: Acupuncture is an effective modality to use for children with pediatric-onset disabilities. It can help to treat the underlying distressing symptoms as well reducing the side-effect burdens of concomitant medical interventions.

Key Words: Acupuncture, Pediatrics, Low-Back Pain, Dysautonomia, Autonomic Dysfunction, Spinal-Cord Injury, Anoxic Injury, Postconcussion Syndrome, Spasticity, Movement Disorder, Cerebral Palsy, Postoperative Distress

INTRODUCTION

Children and young adults with pediatric-onset disabilities face a number of challenges with respect to restoration to health and well-being.[1] Often, an underlying disability increases the frequency with which the child intersects with the medical community.[2] This results in increased clinic visits, procedures, medications, and other medical interventions, many of which introduce their own-side effect burdens while conferring medical benefit.[3,4]

While these children and their families partner with the medical community to engage in plans of care to meet these children's medical needs, the children's families are also increasingly searching for effective nonpharmacologic means of treatment.[5] Acupuncture has shown to be effective for treating a variety of symptoms and comorbid conditions,[6–9] but case reports involving children are scarce. In addition, case reports involving individuals with disabilities are also scarce.

MATERIALS AND METHODS

This retrospective case series highlights 9 patients referred for acupuncture or palliative care at Gillette Children's Specialty Healthcare, St. Paul, MN. The patient's charts were reviewed in accordance with institutional review board approval with exemption status. The referrals

Gillette Children's Specialty Healthcare, Regions Hospital, University of Minnesota Masonic Children's Hospital, St. Paul, MN.

were reviewed by a physician–acupuncturist who determined the modalities used during the treatments. The treatments were performed in either an inpatient hospital room or in the outpatient acupuncture clinic.

Materials

A variety of needles were used for the acupuncture treatments, depending upon the therapy used and the patients' ability to tolerate the treatments. Needles used during these case series include SEIRIN® Pyonex 0.3-mm press needles, SEIRIN Pyonex 1.6-mm press needles, SEIRIN J-type 0.2×30 mm needles, SEIRIN J-type 0.25×30 mm needles, SEIRIN L-type 0.25×30 mm needles, and Aiguille Semi-Permanente (ASP) Gold semipermanent ear needles.

An ITO ES-130 3 channel Electro Stimulation Unit was used when electrical stimulation was applied.

When using the press needles, the acupuncturist would place them over the identified acupuncture points and press the needles into place. Body needles were placed to a depth that would elicit De Qi, either with direct feedback from the patient when possible, or by the acupuncturist's feedback in nonverbal patients. Auricular needles were placed to a sufficient depth to maintain placement in the ear.

The N→N+1 technique utilized in the cases involves an acupuncture energetic circulation technique that uses points along the principal meridian subcircuits by placing needles in dynamic disequilibrium with each other. The acupuncturist must decide whether to create a movement onto Yang by placing the +1 needle on the Yang side of the input program, or to create a reinforcement of Yin by placing the +1 needle on the Yin side of the input program (Fig. 1).

The surface release technique (SRT) in the case series involves acupuncture needles placed at a shallow angle to the skin across the affected region. The needles are placed and observed to cause an erythematous blush that dissipates over the course of the treatment, generally over 20–45 minutes.

Patient Mix

From June of 2014 through June of 2015, 52 individual patients were seen for acupuncture treatments and collectively received 136 treatments. This retrospective case review highlights 9 of these patients to provide a broad overview of ages, presenting complaints, treatment lengths, and treatment modalities (Table 1).

RESULTS

Chronic Back Pain

Case 1: Adolescent idiopathic scoliosis in a 16-year old female. A 16-year-old female presented with a diagnosis of adolescent idiopathic scoliosis and low-back pain. Initial treatment of her scoliosis included bracing for 4½ years. She noted having a general increase in pain with her brace, and the pain was particularly worse over the last 6 months of bracing. The pain was reduced somewhat with cessation of brace therapy ∼6 months prior to presentation in the acupuncture clinic.

This patient described her pain as continuous, with the pain initiating as a headache and traveling down her cervical and thoracic spine before settling into her lower back. She attempted to remain active, but noted that the pain limited her ability to compete in athletic events. Her pain was exacerbated by backward bending, high-intensity swimming, lying in bed, standing, and walking. The pain was reduced by yoga and massage. She had been prescribed tramadol,

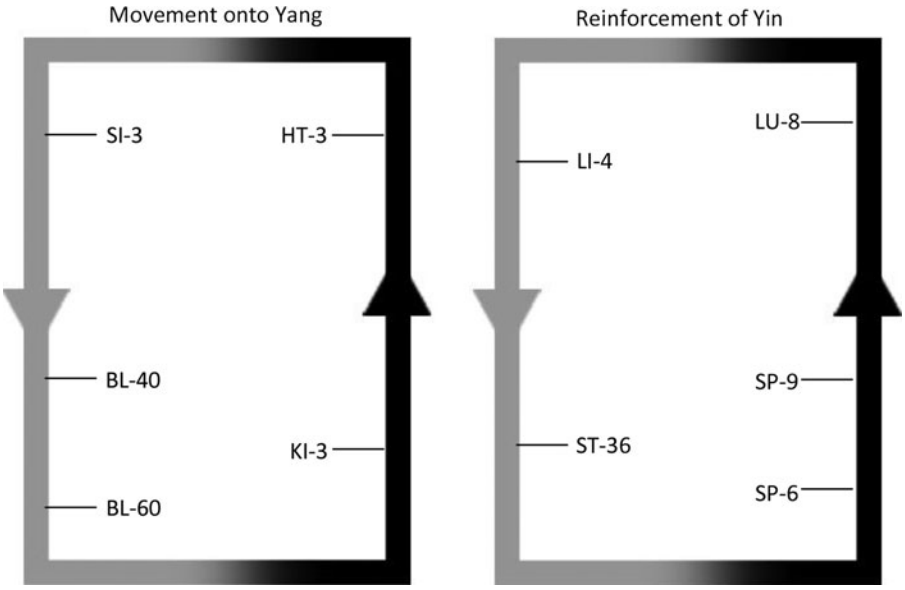

FIG. 1. N→N+1, an acupuncture energetic circulation technique.

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Table 1. Summary of 9 Patients' Presenting Complaints, Underlying Conditions, Ages, & Genders

Case #	*Presenting complaint and underlying condition*	*Age*	*Gender*
1	Low-back pain—adolescent idiopathic scoliosis	16	Female
2	Mid–to–upper-right back pain—benign hypermobility syndrome	13	Female
3	Low-back pain—L-1 Chance fracture, status-post instrumentation	13	Female
4	Autonomic dysfunction—C-2 spinal-cord injury	9	Male
5	Autonomic dysfunction—anoxic brain injury	3	Male
6	Postconcussion syndrome—neck pain	17	Female
7	Postconcussion syndrome—chronic daily headache, neck pain	16	Female
8	Behavioral concerns, chronic daily headache—shunted hydrocephalus, AVM	9	Female
9	Cerebral palsy, mixed-tone (dystonic/spastic) quadriplegia GMFCS V	3	Male

AVM, arteriovenous malformations; GMFCS V, Gross Motor Function Classification System V.

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which she had been taking two to four times per day. Other interventions that had been unsuccessful include meloxicam, acetaminophen, ibuprofen, chiropractic treatments, and transcutaneous electrical nerve stimulation.

This patient had also seen a community acupuncturist, who had been using SRTs on the lower back every 2 weeks. The patient noted mild-to-moderate pain relief that would last for ~3 days. Electrical stimulation had been tried but was not well-tolerated.

The first clinic treatment utilized an N→N+1 pattern along the *Shao Yin/Tai Yang* meridians, with needles placed bilaterally at the points for KI 3, HT 3, SI 3, BL 40, and BL 60. The needles were left in neutral position for 15 minutes. The second treatment utilized the same N→N+1 treatment enhanced by auriculotherapy with semipermanent needles placed at *Shen Men* and the corresponding anatomical point (CAP) for the lumbar spine. The third treatment utilized the same points as the second.

These initial three treatments did produce persistent reduction of her low-back pain, but the effect appeared to have reached a plateau. During her fourth session, percutaneous electrical nerve stimulation (PENS) input was performed with needles placed bilaterally in the paraspinal muscles at L-3 and L-5. Electrodes were placed in a pattern of alternating positive and negative electrodes and ran at a frequency of 30 Hz for 15 minutes. The fifth treatment included an additional PENS treatment with needles placed bilaterally at L-2 and L-4, with the addition of a bilateral peripheral component consisting of needles above and below the posterior superior iliac spine bilaterally. The central module was run at a frequency of 30 Hz and the peripheral modules were run at a frequency of 100 Hz. The entire input was left in place for fifteen minutes and removed without incident. This treatment was enhanced by placement of semipermanent needles at the points for *Shen Men* and the CAP for her lumbar spine.

This patient reported continued improvement over the first three treatments with reduction in her pain. She was able to taper off the tramadol successfully after the first session. With the initiation of the PENS treatments, she was able to return to high-performance athletic activity, with a return to practice on the varsity team. Her pain relief continued to increase in duration to >10 days between sessions. Intervals between sessions ranged from 11 to 20 days (Table 2).

Case 2: Benign hypermobility syndrome in a 13-year-old female. A 13-year-old female presented to the acupuncture clinic with a history of benign hypermobility syndrome and chronic back pain. The back pain began 8 months prior to her clinic appointment, with the onset of a dull, achy pain in the mid–to–upper-right part of her back. Her pain increased during the day as she engaged in sitting, writing, and exercise. The pain was mitigated with a heating pad, osteopathic manipulation therapy, and, minimally, with ibuprofen.

This patient's initial session included the pattern for *Si Shen Cong* as well as auriculotherapy at the points for *Shen Men*, Master Shoulder, and the CAP for her thoracic spine.

Table 2. Case #1: Treatment Protocol for Adolescent Idiopathic Scoliosis & Chronic Low-Back Pain

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1	KI 3, HT 3, SI 3, BL 40, BL 60	–	–
2	KI 3, HT 3, SI 3, BL 40, BL 60	–	*Shen Men*, CAP—lumbar spine
3	KI 3, HT 3, SI 3, BL 40, BL 60	–	*Shen Men*, CAP—lumbar spine
4		PENS at bilateral L-3, L-5	
5		PENS central at L-2, L-4, rays across PSIS	*Shen Men*, CAP—lumbar spine

CAP, corresponding anatomical point; PENS, percutaneous electrical nerve stimulation; PSIS, posterior superior iliac spine.

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The initial treatment was reported by the patient as being ''quite helpful,'' with 5 days of being completely pain-free. Unfortunately, her hypermobility issues did cause bilateral dislocations of both shoulders. Her treatment was modified to include an N→N+1 pattern along the *Jue Yin/Shao Yang* meridians. Needles were placed bilaterally at PC 6, TE 5, and GB 34. They were left in neutral position and removed after 15 minutes. This session was reinforced with auriculotherapy, placing semipermanent needles at *Shen Men*, Master Shoulder, and the CAP for her thoracic spine. She had significant relief of her pain and ligamentous laxity after this treatment and was able to enjoy increased activity with her family without physical challenges.

She presented again after 7 weeks with an onset of increased pain 6 weeks after her last session. The third session was expanded to continue an N→N+1 along the *Jue Yin/Shao Yang* pathways with needles placed bilaterally at LR 2, PC 6, TE 5, TE 8, and GB 34. Needles again were left in neutral position and removed after 15 minutes. The session was reinforced with auriculotherapy, placing semipermanent needles at the points for *Shen Men*, Tranquilizer Point, Point Zero, and the CAP for her lumbar spine.

The patient reported near-total relief of her pain with the initiation of the N→N+1 treatment along the *Jue Ying/Shao Yang* meridians. This also stabilized her ligamentous laxity secondary to her benign hypermobility syndrome (Table 3).

Case 3: History of traumatic L-1 Chance fracture, status–post spinal instrumentation in a 13-year-old female. A 13-year-old female was seen as an inpatient following instrumentation of her back to stabilize an L-1–L-2 facet arthrosis that she developed after previously treated spinal instrumentation 3 years ago to stabilize an L-1 Chance fracture. This fracture had followed a traumatic injury 6 months prior to the initial surgery. During that time, the patient's chronic pain had been managed with many medications and interventions, including tramadol, amitriptyline, naproxen, hydroxyzine, acetaminophen, bracing, physical therapy, and massage therapy—all with poor lasting effects. The initial spinal instrumentation was also removed as a potential source of continued chronic pain, again with minimal benefit.

At an initial inpatient consultation at the time of her instrumentation for stabilization of her facet arthrosis, her medications were optimized to include amitriptyline, cyclobenzaprine, and gabapentin in addition to her perioperative medications of oxycodone, diazepam, acetaminophen, and hydroxyzine.

This patient's initial acupuncture treatment at this time involved auriculotherapy, with needles placed at the points for *Shen Men*, Tranquilizer Point, Master Cerebral, Insomnia One, and the CAP for her lumbar spine. These were left in place for ~15 minutes and removed without incident. She continued to have challenges with pain and comfort following discharge from the hospital, with persistent pain and muscle spasms.

She presented to the outpatient acupuncture clinic ~8 weeks after discharge with complaints of ''shooting electric pain'' near the top of her instrumentation, twitching muscle pain, and whole-back pain. Her sleep remained disorganized since her discharge. She did note that she felt that the inpatient acupuncture was helpful. The second session was aimed at treating her chronic low-back pain by placing an N→N+1 input along the *Shao Yin/Tai Yang* meridians, with needles placed bilaterally at KI 3, HT 3, SI 3, BL 40, and BL 60. These needles were left in a neutral position for 12 minutes and removed without incident. This was reinforced with auriculotherapy placing semipermanent needles at *Shen Men*, Tranquilizer Point, Master Cerebral, Master Shoulder, and Insomnia One. After this session, she was able to discontinue her oxycodone, diazepam, amitriptyline, and acetaminophen. She continued on gabapentin, hydroxyzine, and intermittent cyclobenzaprine.

This patient returned to clinic 2 weeks later, reporting that she was doing ''so much better.'' The family reported that, for the first time in nearly 4 years, she woke up in no pain. They noted that her pain over the past weeks had only gotten as high as a 4 of 10, when, previously, it was routinely >8 of 10. The third session was intended to reinforce prior treatments and maintain benefit by continuing along the *Shao Yin/Tai Yang* pathway utilizing the N→N+1 input, placing bilateral needles at KI 3, HT 3, SI 3, BL 40, and BL 60. These needles were left in neutral position and removed after 15 minutes. This session was reinforced with auriculotherapy, placing semipermanent needles at the points for *Shen Men*, Master Cerebral, Tranquilizer Point, Master Shoulder, and Insomnia One.

This patient is now in maintenance treatment with a recommendation to return to the clinic every 6 weeks for reinforcing therapies until resolution of her pain is achieved (Table 4).

Table 3. Case #2: Treatment Protocol for Benign Hypermobility Syndrome & Chronic Mid–to–Upper-Right Back Pain

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1	*Si Shen Cong*	–	*Shen Men*, Master Shoulder, CAP—thoracic spine
2	PC 6, TE 5, GB 39	–	*Shen Men*, Master Shoulder, CAP—thoracic spine
3	LR 2, PC 6, TE 5, TE 8, GB 34	–	*Shen Men*, Tranquilizer Point, Point Zero, CAP— lumbar spine

CAP, corresponding anatomical point.

Table 4. Case #3: Treatment Protocol for Traumatic Injury & Chronic Low-Back Pain

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1		–	*Shen Men*, Tranquilizer Point, Master Cerebral, Insomnia One, CAP—lumbar spine
2+	KI 3, HT 3, SI 3, BL 40, BL 60	–	*Shen Men*, Tranquilizer Point, Master Cerebral, Master Shoulder, Insomnia One

CAP, corresponding anatomical point.

Autonomic Dysfunction

Case 4: Autonomic dysfunction post C-2 spinal cord injury in a 9-year-old male. A 9-year-old male was receiving inpatient rehabilitation following a traumatic spinal-cord injury (SCI) at C-2. He was tracheotomy/ventilator-dependent, gastrostomy tube–dependent, and quadriplegic. He also had concerns regarding persistent pain, anxiety, abdominal discomfort, and autonomic dysfunction with vital-sign instability.

An acupuncture consultation was requested ~6 weeks after the initial injury. Acupuncture therapy was begun with auriculotherapy, using needles placed at *Shen Men*, Tranquilizer Point, and the CAP for his stomach. Needles were left in place for 15 minutes and removed without incident. He self-reported that he felt better after the treatment, and appeared to be brighter and more animated. Follow-ups 2 days later included reports from nurses and his family that he appeared to be calmer since his initial treatment. He was anxious about the intervention at the second session, so treatment was limited to a single needle placed at GV 20. A follow-up session in 6 days showed interval gains in therapies with increasing function and ability to tolerate bi-level positive airway pressure for limited periods via the tracheotomy.

This patient's family noted continued general benefit with the inclusion of the acupuncture therapies. Given the patient's anxiety around the use of the acupuncture needles, a transition was made to the Pyonex 1.6-mm needles. Needles were placed bilaterally at PC 6. Auriculotherapy was also applied, placing Pyonex needles at *Shen Men*, Point Zero, Tranquilizer Point, Master Cerebral, and the CAP for his stomach. The Pyonex needles were left in place for ~24 hours and removed without incident. He noted that, with the use of the Pyonex needles, the treatment "didn't hurt."

During the next session, 4 days later, use of the Pyonex needles was continued. A modified "autonomic cocktail" was chosen, with Pyonex needles placed bilaterally at the points for PC 6, TE 5, LI 4, and ST 36. The procedure was well-tolerated and the needles were removed without incident after ~24 hours. The next session, 8 days later, was limited to placement of Pyonex needles bilaterally at PC 6 secondary to the patient complaining of an upset stomach. The needles were left in place for ~24 hours and removed without incident.

This patient continued to have improvements with his rehabilitation therapies. His mood continued to improve, his somatic complaints continued to lessen, and his family and nurses noted significant improvements in his overall mood, coping, and stability. At this point, weekly sessions were established using the Pyonex needles at PC 6, TE 5, LI 4, and ST 36. These continued for the next 4 weeks until his discharge.

Table 5 shows the treatment protocol for this patient with autonomic dysfunction following SCI.

Case 5: Autonomic dysfunction following anoxic brain injury in a 3-year-old male. A 3-year-old boy presented to the inpatient rehabilitation ward following a significant anoxic injury after a near-drowning event. Consultation was requested ~8 weeks after the initial injury to help address autonomic dysfunction, spasticity, and swallowing dysfunction. As a result of his injury, he was left with significant static encephalopathy, a tracheostomy, and a gastrostomy tube, in addition to the aforementioned challenges.

Initial therapy began with using the Pyonex needles and auriculotherapy, placing needles at the points for *Shen Men*, Master Cerebral, and the CAPs for his throat, upper arm, and hand. Initial needles were left in place for 36 hours with

Table 5. Case #4: Treatment Protocol for Autonomic Dysfunction Following Spinal-Cord Injury

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1	–	–	*Shen Men*, Tranquilizer Point, CAP—stomach
2	GV 20	–	
3	PC 6	–	*Shen Men*, Point Zero, Tranquilizer Point, Master Cerebral, CAP—stomach
4	PC 6, TE 5, LI 4, ST 36	–	–
5	PC 6	–	–
6+	PC 6, TE 5, LI 4, ST 36	–	–

CAP, corresponding anatomical point.

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noted improvements in mood, affect, and sleep, and his ability to handle his oral secretions, as reported by his parents and bedside nursing staff members. After removal of the initial treatment, parents noted continued benefit with mood and eye contact, but loss of gains in secretion management. In a follow-up session 2 days later, auriculotherapy was continued, with Pyonex needles at the points for *Shen Men*, Master Cerebral, and the CAPs for his throat, mouth, and upper arm. These needles were again left in place for ~36 hours. At a follow-up session 6 days later, it was noted that he had continued benefits in mood and behavior, and sustained improvements in secretion management.

In the interval, he also had a successful removal of his tracheotomy. Auriculotherapy was continued, placing needles at the points for *Shen Men*, Point Zero, Master Cerebral, and the CAPs for his throat and upper arm. These were once again placed without incident and left in place for ~36 hours.

At a follow-up session 9 days later, the family noted being quite pleased with the patient's sustained improvements in mood and affect, and his increased interactions with sustained eye contacts and a more-pleasant mood. Pyonex needles were once again used in auriculotherapy, with needles placed at the points for *Shen Men*, Point Zero, Master Cerebral, Insomnia One, and the CAP for his throat. Once again, he tolerated this well and the needles were removed after 36 hours.

At a follow-up visit 6 days later, it was noted that he had continued sustained improvement. Pyonex needles were used in auriculotherapy, with needles placed at the points for *Shen Men*, Master Cerebral, and the CAPs for his eyes, throat, and cerebellum. Over the course of the treatments, this patient's mood and affect improved significantly, and he was able to be calm and relaxed. He was also able to engage with his environment and smile, increasingly showing positive interactions with his external environment. The final session continued the Pyonex needles and auriculotherapy, placing the needles at the points for *Shen Men*, Master Cerebral, and the CAPs for his eyes and throat.

Overall, the family was thankful for the acupuncture treatments during their son's inpatient rehabilitation and credited the acupuncture with his improvements in being able to manipulate his secretions, as well as the significant gains he was able to make with respect to his mood, affect, interactions, and sleep (Table 6).

Postconcussion Syndrome

Case 6: Postconcussion syndrome with neck pain in a 17-year-old female. A 17-year-old female presented to clinic with an 8-month history of concussion symptoms, including headache and neck pain. She noted that, after the initial injury, her symptoms were gradually reducing until she had an exacerbating injury 4 months prior to her presentation; this injury caused a significant flare of her symptoms, including memory problems, fatigue, headache, and neck pain. Her neck pain was exacerbated by light touch, deep palpation, and stretching. She also described an intermittent facial-nerve pain. She also complained of significant disordered sleep, waking multiple times throughout the night. She had tried acetaminophen and ibuprofen without benefit. Ice packs appeared to exacerbate her neck pain.

Initial acupuncture treatment included the pattern for *Si Shen Cong*, as well as ten needles placed in via an SRT across her bilateral upper trapezii. These patterns were well-tolerated and left in place for ~20 minutes. The treatment was reinforced with auriculotherapy, placing the needles at the points for *Shen Men*, Point Zero, Tranquilizer Point, Master Shoulder, and the CAP for her lumbar spine. These were left in place for 15 minutes and removed without incident. At the conclusion of this initial intervention, she reported that her neck pain was ''50% better'' and that she felt calm and at peace.

At a follow-up 1 week later, it was noted that she had significant reduction of her pain, although she did have some persistent neck and low-back pain. The second treatment also consisted of *Si Shen Cong* and an SRT across her upper back, with fourteen needles placed in a pattern across her upper back and trapezii. The needles were removed without incident after 20 minutes. This treatment was reinforced with auriculotherapy, with needles placed at *Shen Men*, Point Zero, Tranquilizer Point, Insomnia One, and the CAP for her cervical spine. These needles were left in place for 15 minutes and removed without incident.

At a follow-up 1 week later, it was noted that she had resolution of the majority of her symptoms, with some

Table 6. Case #5: Treatment Protocol for Autonomic Dysfunction Following Anoxic Brain Injury

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1	–	–	*Shen Men*, Master Cerebral, CAP—throat, CAP—upper arm, CAP—hand
2	–	–	*Shen Men*, Master Cerebral, CAP—throat, CAP—mouth, CAP—upper arm
3	–	–	*Shen Men*, Point Zero, Master Cerebral, CAP—throat, CAP—upper arm
4	–	–	*Shen Men*, Point Zero, Master Cerebral, Insomnia One, CAP—throat
5	–	–	*Shen Men*, Master Cerebral, CAP—eyes, CAP – throat, CAP—cerebellum
6	–	–	*Shen Men*, Master Cerebral, CAP—eyes, CAP—throat

CAP, corresponding anatomical point.

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persistent residual neck and shoulder pain. Treatment continued to include *Si Shen Cong* and SRT across her upper trapezii, once again, with 16 needles placed bilaterally. These were left in place for 20 minutes and again removed without incident. Once again, treatment was reinforced with auriculotherapy, placing needles at the points of *Shen Men*, Point Zero, Master Shoulder, Tranquilizer Point, and the CAP for her cervical spine. These needles were left in place for 15 minutes, during which time, the patient was dozing lightly. The needles were removed without incident.

After these initial three treatments, this patient's symptoms had resolved for ~4 weeks, at which point, her neck pain began to recur. The fourth treatment included *Si Shen Cong* as well as 20 SRT needles across the bilateral upper trapezii. The needles were removed without incident after 20 minutes. The treatment was reinforced with auriculotherapy, placing semipermanent needles at the points for *Shen Men*, Point Zero, Master Shoulder, and Tranquilizer Point. After the fourth treatment, the beneficial results were sustained (Table 7).

Case 7: Postconcussion syndrome with chronic headache and neck pain, along with concomitant anxiety and depression in a 16-year-old female. A 16-year-old female presented to the clinic following a long history of challenging symptoms after a bicycle injury nearly 2 years prior to presentation. At that time, she had collided with a tree with the right side of her face and jaw. Over the course of the next 22 months, she had ongoing challenges with decreased function, poor appetite, neck pain, daily headache, and jaw pain. She had challenges with concentration and memory, and began failing her classes at school. She had photophobia and phonophobia, and had to make daily visits to the school nurse to address headache. She was diagnosed with depression and hospitalized twice for suicidal ideation and attempted suicide.

This patient had many presentations to the emergency department for acute treatment of her chronic headache. Her sleep was also significantly affected, with very poor sleep 50% of nights. An exhaustive medical workup revealed no other diagnosis other than postconcussion syndrome. She had tried many medications, including acetaminophen/hydrocodone, tramadol, venlafaxine, acetaminophen, ibuprofen, gabapentin, trazodone, and intravenous morphine. She attempted yoga, chiropractic, and massage—all with minimal benefit.

At the initial visit, recommendations were made to taper off all medications and introduce amitriptyline. The initial acupuncture treatment consisted of *Si Shen Cong* as well as an SRT across her bilateral trapezii; she tolerated eight needles. These were left in place for 15 minutes and removed without incident. The therapy was reinforced with auriculotherapy, placing needles at *Shen Men* and Point Zero. These were left in place for 15 minutes and removed without incident. At the conclusion of the initial treatment, she admitted to feeling much calmer and more peaceful, and that her neck felt ''looser.''

At a follow-up 1 week later, it was noted that, overall, she had been ''feeling good'' and that she had significantly fewer headaches. Her mother noted that her daughter had not complained of a headache since her initial treatment. The patient reported that her neck pain had gone away for 2 days, but slowly recurred and was back to pretreatment levels by the time of the follow-up appointment. In addition, her sleep had stabilized.

Given this patient's significant traumatic history and tolerance of the initial treatment, a decision was made to use the pattern for Seven External Dragons (GV 20, bilateral BL 11, BL 23, and BL 61) followed by Seven Internal Dragons (CV 15′, bilateral ST 25, ST 32, and ST 41). She tolerated the procedure well. A follow-up 2 weeks later showed continued interval improvement. She was able to start biking again and engaging in schoolwork. She continued to experience neck muscle ''tightness'' but noted that her pain had been significantly reduced. Therapy was resumed with the pattern for *Si Shen Cong* and SRT needles. She was able to tolerate twelve needles to her bilateral trapezii. The pattern was left in place for 30 minutes and removed without incident. The treatment was reinforced with auriculotherapy, placing needles at *Shen Men*, Point Zero, and Master Shoulder. These were left in place for 15 minutes and removed without incident.

At a follow-up, 2 weeks later, it was noted that the patient had a continued sustained elevated mood. Her neck tightness did recur, with the onset of pain again in the 2 days preceding the appointment. Treatment at this appointment included the pattern for *Si Shen Cong* and twelve needles placed via an SRT again in her upper trapezii. This pattern was left in place for 15 minutes and removed without incident. The treatment was reinforced with auriculotherapy, placing semipermanent needles at the points for *Shen Men*, Master Shoulder, and Tranquilizer Point.

Table 7. Case #6: Treatment Protocol for Postconcussion Syndrome & Neck Pain

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1	*Si Shen Cong*	10 SRT needles	*Shen Men*, Point Zero, Tranquilizer Point, Master Shoulder, CAP—lumbar spine
2	*Si Shen Cong*	14 SRT needles	*Shen Men*, Point Zero, Tranquilizer Point, Insomnia One, CAP—cervical spine
3	*Si Shen Cong*	16 SRT needles	*Shen Men*, Point Zero, Master Shoulder, Tranquilizer Point, CAP—cervical spine
4	*Si Shen Cong*	20 SRT needles	*Shen Men*, Point Zero, Master Shoulder, Tranquilizer Point

SRT, surface release technique; CAP, corresponding anatomical point.

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At a follow-up 2 later, it was noted that she was completely pain-free for 3 days, with a gradual return of her headache and neck pain. She noted that the semipermanent needles appeared to have extended the benefit of the acupuncture treatments. Once again, treatment consisted of *Si Shen Cong* and an SRT to her upper trapezii, with her tolerating 14 needles. Treatment was reinforced with auriculotherapy, placing semipermanent needles at *Shen Men*, Master Shoulder, Tranquilizer Point, and the CAP for her frontal skull.

She continued to do well and was followed-up 5 weeks later, noting that, at that timepoint, she had 3–4 pain-free days per week, and 3–4 days with some level of neck pain and, rarely, headache. Treatment consisted of *Si Shen Cong* and needles placed via an SRT across her trapezii. This was tolerated well and removed after 15 minutes. The treatment was reinforced with auriculotherapy, placing semipermanent needles at *Shen Men* and Master Shoulder.

At a follow-up 2 later, it was noted that she was enjoying her classes at school and participating in cheerleading. She continued to have some intermittent neck pain and noted a slight increase in frequency, prompting a return to clinic. She tolerated the needles for *Si Shen Cong* and the SRT again along her bilateral trapezii, now tolerating up to 18 needles. This was well-tolerated, and she noted significant improvement at the completion of the treatment.

At a follow-up 3 months later, it was noted that she had tapered off her amitriptyline successfully—this was her last scheduled medication. She reported that her grades had again improved to her preaccident As and Bs, and that her mood remained quite good. She reported having headaches approximately twice per week, but that they were significantly less-intense than before initiation of therapy. At this session, the treatment included *Si Shen Cong* and needles in an SRT pattern across her bilateral trapezii, with her tolerating twenty needles. This was left in place for $\sim$15 minutes and removed without incident. At the completion of this session, she noted sustained benefit and required no further acupuncture appointments (Table 8).

Behavioral Concerns

Case 8: Behavioral concerns with shunted hydrocephalus and chronic daily headache in a 9-year-old female. A 9-year-old female presented to the acupuncture clinic with a past medical history significant for a large facial port-wine stain, with associated arteriovenous malformations (AVMs), a shunted hydrocephalus, chronic daily headaches, and acting out behaviors (short-tempered, irritable, overly sensitive, explosive outbursts). Her complaints began causing frequent school absenteeism and withdrawal from activities, including physical and family activities. After an appropriate medical workup, no physiologic cause could be found for her worsening symptoms.

Given this patient's age and significant anxiety, Pyonex needles were used with auriculotherapy at the points for *Shen Men*, Tranquilizer Point, Insomnia One, and the CAP for her frontal skull. The needles were left in place for 24 hours and removed without incident in the child's home. Upon follow-up in 3 weeks, she reported that her mood had been improved, having been able to go bowling three times with her family and attend a parade. She notes that school has also been going well. Most notably, the family notes that her headaches had remarkably reduced. Although improved, she continued to have challenges with irritability and crying spells, but that there was a dramatic reduction in her aggression and impulsivity. At the second visit, Pyonex needles were used in a modified ''autonomic cocktail'', placing bilateral needles at LI 4, PC 6, TE 5, and ST 36. She was able to tolerate J-type needles for auriculotherapy and these were placed at *Shen Men* and the Tranquilizer Point. The J-type needles were removed after 15 minutes without incident. The Pyonex needles were removed by the family in 24 hours without incident at home.

Table 8. Case #7: Treatment Protocol for Postconcussion Syndrome & Chronic Headache, Neck Pain, Anxiety, & Depression

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1	*Si Shen Cong*	8 SRT needles	*Shen Men*, Point Zero
2	Seven External Dragons (GV 20, bilateral BL 11, BL 23, BL 61), Seven Internal Dragons (CV 15′, bilateral ST 25, ST 32, ST 41)	–	–
3	*Si Shen Cong*	12 SRT needles	*Shen Men*, Point Zero, Master Shoulder
4	*Si Shen Cong*	14 SRT needles	*Shen Men*, Master Shoulder, Tranquilizer Point, CAP—frontal skull
5	*Si Shen Cong*	14 SRT needles	*Shen Men*, Master Shoulder
6	*Si Shen Cong*	18 SRT needles	–
7	*Si Shen Cong*	20 SRT needles	–

SRT, surface release technique; CAP, corresponding anatomical point.

Table 9. Case #8: Treatment Protocol for Behavioral Concerns & Shunted Hydrocephalus with Chronic Daily Headache

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1	–	–	*Shen Men*, Tranquilizer Point, Insomnia One, CAP—frontal skull
2	LI 4, PC 6, TE 5, ST 36	–	*Shen Men*, Tranquilizer Point
3	LI 4, PC 6, TE 5, ST 36, with electrical stimulation	–	–
4+	LI 4, PC 6, TE 5, ST 36	–	–

CAP, corresponding anatomical point.

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At a follow-up 1 month later, it was noted that this patient had continued sustained benefit, but there was still concern regarding some continued acting-out behaviors. She continued to respond positively to the idea of acupuncture treatment and, during the third treatment, she was able to tolerate L-type needles bilaterally at the points for LI 4, PC 6, TE 5, and ST 36. A tonification current of 4 Hz was run between contralateral LI 4 and ST 36 bilaterally. The entire procedure was well-tolerated, and the needles were removed in 15 minutes without incident.

At a follow-up 3 weeks later, it was noted that she was doing well at school and was able to go ice skating with her family. The family noted, however, that they felt the last treatment was ''too draining,'' and they also noted a coincident increase in the patient's headaches, which were attributed to the electrical stimulation. The treatment at the fourth session consisted of needles bilaterally at LI 4, PC 6, TE 5, and ST 36. These were left in neutral position for 15 minutes and removed without incident.

At a follow-up 2 weeks later, it was noted that she had significant interval improvement with resolution of her pain, an ability to play sports at school, and even experiencing an entire weekend of calm without any emotional outbursts. At that timepoint, she was transitioned to maintenance therapy with the use of the modified ''autonomic cocktail'' (Table 9).

Cerebral Palsy

Case 9: Cerebral palsy with mixed-tone (spastic and dystonic) quadriplegia Gross Motor Function Classification System V in a 3-year-old male. A family brought their 3-year-old boy to the palliative care clinic to help coordinate his complex medical care. He had a past medical history significant for perinatal hypoxic ischemic encephalopathy with resultant cerebral palsy, mixed-tone (spastic and dystonic) quadriplegia Gross Motor Function Classification System V, dysautonomia, epilepsy, and global developmental delay. The family members stated that they were interested in nonpharmacologic management of this patient's distressing symptoms, including challenges with positioning, irritability, and sleep; and overall increased well-being for this patient was also desired.

Pyonex needles were used in a modified ''autonomic cocktail'' at the points for LI 4, PC 6, TE 5, and ST 36. The procedure was well-tolerated by the boy, and his parents were instructed to remove the needles in 24 hours. The family members reported that they felt he had significant benefit with respect to calming and sleeping, as well as tolerating some positions better. Given a significant distance from the clinic (more than 4 hours by vehicle), the family elected to follow-up locally, using the recommended needling pattern (Table 10).

DISCUSSION

Using acupuncture in children with complex chronic conditions is not without its challenges. Additional levels of complexity are brought into play when a child also has communication challenges or is nonverbal. Furthermore, many children with complex chronic conditions have experienced significantly more painful encounters with the healthcare industry and therefore have an additional layer of anxiety regarding clinic visits and procedures.[10]

Age

When working with children and young adults with pediatric-onset disabilities, the acupuncturist must consider not only the chronological age of the patient, but also the patient's developmental age and maturity. It is essential to partner with a patient's parents prior to beginning the acupuncture treatments. The parents can serve as guides as to their initial impression as to what their child can tolerate, as well as

Table 10. Case #9: Treatment Protocol for Cerebral Palsy & Mixed-Tone Quadriplegia

Session	*Energetic*	*Biomechanical*	*Auriculotherapy*
1	LI 4, PC 6, TE 5, ST 36	–	–

providing a soothing comforting presence. At the same time, it remains the acupuncturist's responsibility to adapt the treatments based upon the patient's response to the interventions.

When working with infants and toddlers, Pyonex press needles are appropriate starting needles. The choice in length of needle (0.3–1.6 mm) will vary depending on the age and response of each patient. For initial sessions, the 0.3-mm needles are appropriate until the patient's tolerance can be gauged. With the application of the Pyonex needles, most children will have some adverse response to the needle being applied, but, with parental encouragement and a soothing voice, the effect is short-lived and well-tolerated. If the child cannot be soothed easily, the treatment should be stopped.

Once initial proof of tolerance is demonstrated, the majority of preadolescents and adolescents will be able to ''graduate'' to traditional needles. However, as in any encounter with pediatric patients, the developmental level of each patient needs to be respected. This also factors into the developmentally appropriate child and young adult being able to exercise some autonomy over the interventions. Allowing a child to have input into which needles to use (e.g., Pyonex versus L-type) builds trust and comfort with the acupuncturist, allowing for improved and sustained responses to treatment over time.

A final consideration in age is the closing of fontanelles in the infant. If the posterior fontanelle is still open, one should avoid utilizing GV 20.

Needle Phobia

In addition to the developmental considerations listed above, it must be recognized that many children, especially those with repeated frequent encounters with the medical world, have developed some level of needle phobia. Whether a child's experience is limited to routine vaccinations or the child has had repeated blood draws and procedures, overcoming needle phobia is critical to the continued success of an ongoing therapeutic relationship.

The first step is determining which needles to use. In cases when significant concerns are raised, one should begin with Pyonex needles until comfort with the procedures is determined. When developmentally appropriate, discussion with the child at a developmentally appropriate level should include noting how the needles are safe, single-use, solid, and different from the needles they may be familiar with. Allowing the child to see and handle a needle also helps to normalize the experience. It can also be helpful to demonstrate the technique for the child on a willing parent or even on the acupuncturist. In these cases, needling LI 4 on a willing adult can demonstrate safety and comfort.

It is also helpful when beginning sessions with children with significant needle phobia to utilize points that such children cannot see. Thus, auriculotherapy and points on the crown of the head (GV 20, *Si Shen Cong*) are appropriate high-yield, low-anxiety interventions.

Disabilities

Children with disabilities pose unique challenges above and beyond the recently discussed developmental concerns. These children may have significantly altered anatomy, implanted medical devices, underlying movement and tone challenges, and unique problems with respect to point and meridian selections.

When challenged with significant alterations in anatomy, the acupuncturist should reflect upon where meridians and points would course in a typical child. As an example, a child with cleft-foot syndrome who only has two rays in her foot and postsurgical scarring would still have a point for LR 2 distal to the first and second metatarsals. In addition, in a young adult with underlying spinal muscular atrophy type 2 and progressive neuromuscular scoliosis, the Bladder meridian still courses 1½ cun lateral to associated spinous processes. Finally, if the underlying condition causes compromise of a point, the acupuncturist must adjust the therapy to accommodate the condition (e.g., not needling near a known or suspected AVM).

Implanted devices will affect the choice of points and therapies used. The acupuncturist must avoid harming the integrity of any implanted device. Ventriculoperitoneal shunts may limit the choice of points on the skull and neck. Intrathecal pumps will limit the choice of points on the abdomen and low back. Presence of a vagal-nerve stimulator or deep-brain stimulator could override the acupuncturist's choice of using electrical stimulation.

Tone will affect the choice and tolerance of points in children with significant spasticity, dystonia, or choreoathetoid movements. With spasticity and dystonia, points should be avoided if the extremity will contract after placement of a needle. For example, if a child has very high tone or dystonia, although it may be possible to extend the forearm gently and place a needle at PC 6 for nausea, if the child will contract or have dystonic posturing such that the tendons of the forearm will shear around this point, it should be avoided and alternate points (auriculotherapy) should be considered. In a child with significant movements, a steady hand and patience is required for successful placement of needles.

When deriving a needle pattern for children and patients with disabilities, all of the above will become part of the decision-making process. In working with children with chronic low-back pain, working along the *Shao Yin/Tai Yang* meridians is beneficial. Children with tone issues benefit from work along the *Jue Yin/Shao Yang* meridians. Autonomic conditions will respond well to patterns along the *Tai Yin/Yang Ming* meridians. For children with complex chronic conditions, it is important to note that many of these children have an overall depletion of Qi. Therefore, patterns that build up Yin as opposed to pulling off Yang are beneficial. In cases when the decision to pull off Yang is made, it is helpful to inform parents that their children may be more depleted and tired for the next 12–36 hours.

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Integrating with Medical Subspecialty Care

In a medical hospital and clinic with many subspecialty care offerings, it is essential for the acupuncturist to be a dutiful consultant and provide complementary care.[11,12] For a physician–acupuncturist, changes to underlying medical interventions (e.g., therapies, medications) must only be done within the scope of practice and with clear and open communication to the referring providers.

CONCLUSIONS

Acupuncture can be a safe, well-tolerated, and effective therapy for children and young adults with pediatric-onset disabilities. It may be effective in treating acute and chronic distressing symptoms, as well as helping restore balance and well-being in children with complex chronic conditions.

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REFERENCES

1. Schwantes S, O'Brien HW. Pediatric palliative care for children with complex chronic medical conditions. *Pediatr Clin North Am.* 2014;61(4):797–821.
2. Hall DE. The care of children with medically complex chronic disease. *J Pediatr*. 2011;159(2):178–180.
3. Burke RT, Alverson B. Impact of children with medically complex conditions. *Pediatrics*. 2010;126(4):789–790.
4. Cohen E, Berry JG, Camacho X, Anderson G, Wodchis W, Guttmann A. Patterns and costs of health care use of children with medical complexity. *Pediatrics*. 2012;130(6):e1463–e1470.
5. Fiks AG, Mayne S, Localio AR, Feudtner C, Alessandrini EA, Guevara JP. Shared decision making and behavioral impairment: A national study among children with special health care needs. *BMC Pediatr*. 2012;12:153.
6. Yang C, Hao Z, Zhang LL, Guo Q. Efficacy and safety of acupuncture in children: An overview of systematic reviews. *Pediatr Res.* 2015;78(2):112–119.
7. Chon TY, Lee MC. Acupuncture. *Mayo Clin Proc*. 2013; 88(10):1141–1146.
8. Kundu A, Berman B. Acupuncture for pediatric pain and symptom management. *Pediatr Clin North Am.* 2007; 54(6):885–889,x.
9. Adams D, Cheng F, Jou H, Aung S, Yasui Y, Vohra S. The safety of pediatric acupuncture: A systematic review. *Pediatrics.* 2011;128(6):e1575–e1587.
10. Yamaguchi R, Nicholson Perry K, Hines M. Pain, pain anxiety and emotional and behavioural problems in children with cerebral palsy. *Disabil Rehabil.* 2014;36(2):125–130.
11. Wong V, Cheuk DK, Lee S, Chu V. Acupuncture for acute management and rehabilitation of traumatic brain injury. *Cochrane Database Syst Rev*. 2012;12:CD007700.
12. Duncan B, Shen K, Zou LP, et al. Evaluating intense rehabilitative therapies with and without acupuncture for children with cerebral palsy: A randomized controlled trial. *Arch Phys Med Rehabil.* 2012;93(5):808–815.

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