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## **Reflexology for the Restoration of Anosmia As A Result Of A Traumatic Brain Injury**

**Introduction:** Anosmia, or loss or impairment of the sense of smell, due to a traumatic brain injury (TBI) is a common development. Depending on the severity of the head trauma, anosmia might occur in up to 30% of patients. Recovery has been reported to be a couple of months in most cases. Recovery after more than one or two years seems to be relatively rare.

**Objective:** The intent for this study is to see whether focused reflexology can awaken the sense of smell in an individual suffering from anosmia due to a TBI two and a half years prior to the time of this study.

### **Previous Literature:**

One example of success that reflexology has had with nasal damage due to brain injury has been found in the study in a 57-year-old woman in China. After falling off her bike, the Subject suffered a cerebral concussion, accompanied by a painful forehead, red, swollen right eye, congestion of eyeball and right nasal nerve block. An x-ray showed mild brain hemorrhage and cerebral concussion. She was given foot reflexology daily after unsuccessful treatment with Traditional Chinese and Western Medicine. After the third reflexology treatment her dizziness and headache were reduced. After four treatments her symptoms were non-existent, except for the nerve block in right nose. She was treated with foot and hand reflexology every other day focusing on the nose reflex areas. The study authors proclaimed the Subject was cured and able to breathe freely.

### **Subject:**

The Subject is a 37-year-old woman that suffered a TBI in August 2014 and has since then has suffered from anosmia. No other attempts to resolve this issue had been made when the Subject was approached by the Therapist for participation in this study.

This study will be presented from two perspectives; firstly, that of the Subject and secondly, that of the Therapist.

During pre-session interview, Subject had noted being able to pick up only the scent of cilantro and garlic since her accident. All other senses are intact and subject states no other residual effects from her TBI, other than depression, for which she has been prescribed Sertraline by her medical doctor. Subject stated that she is otherwise in healthy condition and exercises regularly. The only other checkmark on her health history intake form is a stiff neck with stress.

Subject and Therapist agreed to meet once a week at 10:00am on Tuesdays for six weeks at the Therapist's office, beginning December 6, 2016 and ending January 10, 2017.

Treatment plan is 60-minutes of combined hand and foot Reflexology on the reflexes of the nose, mouth/tongue, sinuses, brain, cerebrum, and cerebellum, with equal time spent between each hand and foot. No other modalities will be used during the sessions. i.e. music, aromatherapy, massage therapy. The Subject agreed to forego the massage sessions she normally received to participate in this research case study.

Subject agreed to keep a diary to document her experiences between the sessions was given a take-home handout with illustrations for working her own brain reflexes. Subject was asked to put forth effort to work her own brain reflexes daily and to document any changes she experiences during the time of the research case study.

During pre-session interview the Subject was asked if there was a particular smell that she really missed. Subject responded with flowers first; then coffee, which she stated that she "rarely drinks anymore, only for its caffeine boost maybe once a week", and that it has been like drinking "hot, bitter water" since her TBI. The Subject then stated that she really just misses smelling food in general. Therapist also asked if subject had noticed any association with tasting bringing out her sense of smell, to which the answer was "no".

**Protocol:**

During each session the subject was given a pillow under her head, a bolster under her knees, and was covered with a blanket. The treatment table was also heated and the lighting kept low.

It was agreed to begin each session on the left foot, followed by the right foot, right hand and left hand.

Work on each appendage began with a number of select relaxation techniques, followed by thumb and finger-walking, press and roll, and working specifically on the reflexes of the nose, mouth/tongue, sinuses, brain, cerebrum, and cerebellum with static pressure and micro-friction.

Following the hands-on session, Subject moves to a seated position and is presented with four different substances to inhale while keeping her eyes closed. Each substance is housed in a small glass bowl. The Subject is given sufficient time (approximately 15 seconds, or three to four long inhales through the nose) to identify what she smells, if anything. On a scale of zero to five, Subject then reports what level of smell recognition she is experiencing, zero being nothing sensed and five being very intense.

**Session 1: December 6, 2016:**

Congestion noted in bilateral cerebellum reflexes in both the feet and hands, left foot brain reflexes in Zones 2 and 3.

#### Smell Test:

\* *Substance #1- Chocolate:* Subject took three long inhalations. Subject related that she was picking up on something but could not specify what it was. Subject assigned a #1.

\* *Substance #2 - Vanilla extract:* Subject took three long inhalations. Subject thought she was picking up on something but could not describe what it was. When asked to give a descriptive word she stated that it was possibly almond extract. Subject assigned a #1.

\* *Substance #3 – Peppermint essential oil drop on cotton ball:* Subject took three long inhalations and stated that it “smells kinda minty”. Subject assigned a #1.

\* *Substance #4 – Ground coffee:* After one long inhalation the Subject stated, “That’s coffee!” and assigned a #3.

#### At-Home Diary

\* December 7, 2016: “I drank coffee today because I was so excited that I could smell it yesterday!”

Self-care Reflexology: 5 minutes fingertips

\* December 8, 2016: Smelled coffee at the office.

Self-care Reflexology: 5 minutes fingertips

\* December 9, 2016: Self-care Reflexology: 5 minutes fingertips

\* December 11, 2016: Self-care Reflexology: 5 minutes fingertips

\* December 12, 2016: Self-care Reflexology: 5 minutes fingertips

#### **Session 2: December 13, 2016:**

During our pre-session interview, I asked the subject if she has anything to report from the past week. She stated that she has enjoyed multiple cups of coffee as she has begun to smell and taste it. Congestion noted in: left foot brain reflexes in Zones 2 and 3, bilateral cerebellum reflexes of feet. Left hand sinus reflexes in Zones 4 and 5 at distal ends, left hand brain reflex Zone 4, bilateral proximal cerebellum reflexes in hands.

Following session, Subject stated she felt “relaxed” but that she experienced sharp pain in the tips of digits 3 through 5 in both feet, more so on the right foot.

#### Smell Test:

\* *Substance #1- fresh sliced orange:* Subject stated that she was picking up on a scent, and when asked for a descriptive word stated “alcohol”. Subject assigned a #2.

\* *Substance #2 – vanilla extract:* Subject assigned a #1, no smell recognition.

\* *Substance #3 – fresh rosemary:* “Indistinguishable flowery smell”, subject assigned a #2.

\* *Substance #4 – rubbing alcohol on a cotton ball:* Subject stated that this was a “strong smell but indistinguishable.” When asked if she could give a descriptive word she used “flowery”. Subject assigned a #3.

### At Home Diary

\*December 13, 2016: Self-care Reflexology: 5 minutes fingertips

\*December 14, 2016: Self-care Reflexology: 5 minutes fingertips

\*December 16, 2016: "I THOUGHT I smelled body odor at the airport. I asked my boyfriend if that's what he was smelling and he said, 'Yes', but it turned out to be the pizza that the guy just walked by was holding."

Self-care Reflexology: 10 minutes.

\*December 18, 2016: "Cinnamon smell at the airport!"

Self-care Reflexology: 10 minutes

\*December 19, 2016: Self-care Reflexology: 5 minutes fingertips

### **Session 3: December 20, 2016**

During our pre-session interview the Subject shared that she can smell the "minty" in gum and that on Friday, December 16<sup>th</sup> and Sunday, December 18<sup>th</sup> she picked up on the scent of barbeque sauce and that it was "tangy".

Congestion noted: left foot cerebellum reflex and brain reflexes in Zones 2 and 3, right foot cerebellum reflex and brain reflex in Zone 3, right hand cerebellum reflex and sinus reflexes in Zones 3 and 5 and left hand cerebellum reflex as well as sinus reflexes in Zones 4 and 5.

After the session Subject shared that she still experienced a "sharp" sensation on the tips of her toes as well as some fingertips; which ones were not specified. She also shared that this sensation was not as intense as week two and that week two sensation was not as intense as week one.

### Smell test:

\**Substance #1- chopped yellow onion*: Subject stated "I don't know what it is, but I don't like it" and that she can smell something but cannot distinguish what it is. Subject assigned a #3.

\**Substance #2 – ground cinnamon*: Subject assigned a #1 and reported that she "can't tell".

\**Substance #3 – peanut butter*: Subject assigned a #1 and reported "vanilla-y".

\**Substance #4 – fresh rosemary*: Subject assigned a #1 and reported that she "can't tell".

Subject shared after the smell test that she believes being slightly congested the past week may have affected today's test.

### At Home Diary

\*December 21, 2016: "Smelled actual pizza at a holiday party, so I think baked crust and cheese?"

Self-care Reflexology: None

\*December 22, 2016: Self-care Reflexology: 5 minutes fingertips

- \*December 23, 2016: Self-care Reflexology: 5 minutes fingertips
- \*December 25, 2016: "For Christmas, my brother made a ham. It smelled like love!"  
Self-care Reflexology: 5 minutes fingertips
- \*December 26, 2016: "When I went to scoop the kitty litter I could smell cat poop."  
Self-care Reflexology: 10 minutes fingertips

#### **Session 4: December 27, 2016**

Subject reports smelling cloves and tasting oranges. She also reported her sinuses feeling "cleared-up" after our session last week.

Congestion noted in: bilateral cerebellum reflexes on the feet, right hand cerebellum reflex and sinus reflexes in Zones 2, 3 and 5, and left hand cerebellum reflex as well as sinus reflexes in Zones 3 and 5. Subject reported experiencing the "sharp" sensations again in the reflexes of the brain in Zones 4 and 5 in both feet.

#### Smell test:

- \**Substance #1- peppermint oil drop on a cotton ball:* Subject assigned a #2 and stated that substance "Smells kinda minty".
  - \**Substance #2 – ground coffee:* Subject immediately identified substance as coffee and assigned a #3.
  - \**Substance #3 – peanut butter:* Nothing noted. #0 was assigned.
  - \**Substance #4 – lemon extract:* Subject stated "Citrus-y for sure" and assigned a #3.
- Homework given: Continue self-care with particular attention to the cerebellum reflexes. Therapist demonstrated how to do this and where those reflexes are.

#### At Home Diary

- \*December 28, 2016: "Smelled tator tots."  
Self-care Reflexology: 5 minutes fingers; 5 minutes toes.
- \*December 30, 2016: Self-care Reflexology: 5 minutes fingertips; 5 minutes toes.
- \*January 2, 2017: "Tasted tomato juice in Bloody Mary."  
Self-care Reflexology: None

#### **Session 5: January 3, 2017**

Subject reported both smelling and tasting a beef roast, smelling her cat's feces, and smelling citrus (limes and grapefruit).

Congestion noted in: bilateral cerebellum reflexes in the Subject's feet and hands. Therapist noticed less congestion throughout the Subject's sinus reflexes. Subject shared that she has felt much clearer in the sinuses since last week as well.

#### Smell test:

- \**Substance #1- distilled vinegar:* Subject could not describe the substance, but stated she "felt a biting or burning feeling, for lack of better description". Subject assigned a #3.
- \**Substance #2 – ground cinnamon:* Subject assigned a #1 and stated that "there was something there in the beginning but it doesn't come through".

\**Substance #3 – almond extract*: Subject stated that substance was “sort of sweet” and assigned a #3.

\**Substance #4 – fresh basil*: Substance noted as “flowery” and assigned a #3.  
No homework given.

#### At Home Diary

\*January 4, 2017: Self-care Reflexology: 5 minutes fingertips

\*January 5, 2017: Self-care Reflexology: 5 minutes fingertips

\*January 6, 2017: Self-care Reflexology: 5 minutes fingertips

\*January 8, 2017: “I think I tasted the sirloin and onions and tomatoes in a dish I made.  
Self-care Reflexology: None

\*January 9, 2017: Self-care Reflexology: 5 minutes fingers and 5 minutes toes

#### **Final Session: January 10, 2017**

Client reports smelling grapefruit juice.

Congestion noted in: sinus reflexes in Zones 3 and 5 of the left hand, sinus reflex in Zone 3 of the right hand, and bilateral cerebellum reflexes in feet and hands.

#### Smell test:

\**Substance #1- canned tuna*: Subject stated, “My brain can’t place it.” When asked for a descriptive word she stated, “strong coffee” and assigned a #3.

\**Substance #2 – chopped white onion*: Subject stated that substance was “really strong”. When asked for a descriptive word, she said “onion-y” and assigned a #4.

\**Substance #3 – cooked bacon*: Subject assigned a “4” but she could not place what the aroma was.

\**Substance #4 – fresh flowers (star-gazer lily and pink rose)*: Subject stated that substance “smells flowery” and assigned a #4.

Homework moving forward: Work on re-familiarizing brain with aromas by smelling things as she eats them or comes into contact with them.

#### **Results**

Subject shared the following statement, “I looked forward to my sessions every week. They were relaxing and made me hopeful. It was a great experience and I appreciate having been afforded the opportunity. I can smell some things now and I intend to continue reflexology sessions so that I can smell even more!”

As the Therapist, I noticed a definite improvement in the Subject’s report of sense of smell. From being able to smell ground coffee after the first reflexology session and enjoying it more regularly from then on, to following her excitement as her sense of smell picked up on aromas that had been lost to her since her TBI, to watching the numbers used for our measuring scale on smell intensity rise, it is clear that the Subject experienced notable improvement in her olfactory system.

#### **Resources**

<http://ncbi.nlm.nih.gov/pmc/articles/PMC2767158/> Christian A Mueller and Thomas Hummel, "Recovery of olfactory function after nine years of post-traumatic anosmia: a case report".

<http://www.reflexologyresearch.net/ReflexologyNoseResearch3.shtml> Zhong, Z., and Xie, Q., "One Case Report on Curing Nasal Nerve-Block with Foot Reflexology." 1996 China Reflexology Symposium Report, Beijing: China Reflexology Association, pages 115-116.