Lifestyle and ABC-DS Study

Promoting Healthy Aging in Down syndrome: Physical Activity Edition

September 2022

Physical Activity and Alzheimer's Disease in Down syndrome

As people with Down syndrome age into middle and older adulthood, they begin to develop brain changes related to Alzheimer's disease. These changes include the buildup of proteins called amyloid beta and tau. Some people with Down syndrome develop these brain changes and experience memory problems at a much earlier age than others. These differences made researchers interested in looking at how lifestyle may be playing a role in healthy brain aging in Down syndrome. A recent study by ABC-DS researchers found that adults with Down syndrome who spent more time in moderate-to-vigorous physical activity (i.e., activities that get your heart rate up) and less time being inactive (i.e., sitting around) in their daily life had better memory and fewer dementia symptoms. The study also found connections between being inactive and changes in the brain related to white matter.

In the study, participants wore a wristband (shown here) that recorded how active they were each day for seven days.

White matter consists of nerve cells that connect areas of the brain. When there is damage to white matter, there can be problems with memory, balance, and mobility. The study found that being inactive was associated with lower quality white matter, suggesting that being less active may be linked to memory, balance, and mobility problems in adults with Down syndrome. Overall, this study suggests that being physically active may have positive effects on healthy aging in adults with Down syndrome.

Physical Activity and Medical Conditions

The average lifespan for adults with Down syndrome has increased considerably in the last few decades. As adults with Down syndrome live longer, there is a need to support healthy aging. Adults with Down syndrome are at an elevated risk for medical conditions such as thyroid disorders, sleep apnea, depression, and anxiety.

A recent study by ABC-DS researchers found that physical activity has connections to the physical and mental health of middle-aged adults with Down syndrome. Specifically, the researchers found that doing more moderate-to-vigorous physical activity was associated with a lower risk for sleep apnea, endocrine/metabolic conditions (e.g., high cholesterol and being overweight), and anxiety disorders. This means that lifestyles that include activities that get your heart rate up - such as walking, swimming and dancing - may help foster better physical and mental health in adults with Down syndrome.

Lifestyle and ABC-DS Study	Tips for Healthy Aging	September 2022

1. **Cat/Cow:** This pose increases the flexibility of the neck, shoulders, and spine. The movement also stretches the muscles of the hips, back, abdomen, and chest.
    a. Come down to the floor on your hands and knees.
    b. Be sure your hands are directly below your shoulders and your knees are under your hips.
    c. As you inhale, drop your belly towards the floor and extend your gaze upwards, feeling a stretch through your back and shoulders.
    d. As you exhale, bring your chin towards your chest and begin to arch your back (like a scared cat), holding your belly button towards your spine.
    e. Repeat these motions with your natural breath.

2. **Chair Squat:** Chair squats are a great way to build up the strength in your leg muscles if you're new to working out. The chair provides added support as you work your glutes, hamstrings, and quads.
    a. Sit on a chair with your feet flat on the ground.
    b. Keep feet shoulder-width apart.
    c. Extend your arms straight out in front of you at shoulder height.
    d. Using your leg muscles push your feet into the ground as you rise up to standing
    e. Slowly lower yourself back down to the chair without using your arms.
    f. Repeat this.
    g. As you get stronger you can start to do these squats without the chair!

3. **Side Stretches:** Side bends bring balance to your entire body. They lengthen the abdominal muscles, hips, and thigh muscles while improving flexibility in the spine. Side bends also stretch the muscles between the ribs!
    a. Sit in your chair with your feet flat on the ground or stand up straight.
    b. Reach your right arm straight up over your head. Keep your left hand on your hip or the wall for balance.
    c. Reach the top of your head up tall and slowly lean over to the left as far as you comfortably can, be sure to keep pulling your hand away from your body. Try to keep your shoulders away from your ears.
    d. Come back to center and now slowly lean over to the right as far as you can.
    e. Repeat on each side.

4. **Stomach Twist:** Stretches the neck, chest, shoulders, upper and lower back. Opens up the hips and improves posture, this can also help to alleviate neck and upper back pain.
    a. Sit in your chair with your feet flat on the ground or stand up straight.
    b. Hold your arms out to the side at shoulder height and fold your arms up, like football goal posts.
    c. Now without moving your hips, slowly twist your torso to the left as far as you can comfortably go, then slowly come back to the center.
    d. Now slowly twist to the right and come back to the center.
    e. Repeat on each side.

5. **Leg/Knee Lifts:** Knee lifts activate your quadriceps, hamstrings, calves, glutes, and hip flexors. This helps improve muscular endurance, balance, and coordination in these muscles. It's also good for your core!

    a. Sit in your chair with your feet flat on the ground or stand up straight. You can use the wall or the back of a chair for balance while standing.
    b. Sit or stand up straight.
    c. Lift your right leg out in front of you and bend at the knee as high as you feel comfortable.
    d. Try to hold the position for at least 5 seconds or longer if you can.
    e. Slowly lower your foot back to the floor.
    f. Complete the procedure with your left leg.
    g. Repeat the exercise by alternating legs.

Thank you to our friends who posed for pictures in this newsletter!

Article Citations

Fleming, V., Piro-Gambetti, B., Patrick, A., Zammit, M., Alexander, A., Christian, B. T., Handen, B., Cohen, A., Klunk, W., Laymon, C., Ances, B. M., Plante, D. T., Okonkwo, O., & Hartley, S. L. (2021). Physical activity and cognitive and imaging biomarkers of Alzheimer's disease in down syndrome. *Neurobiology of Aging*, *107*, 118-127. https://doi.org/10.1016/j.neurobiolaging.2021.07.016

Fleming, V., Piro-Gambetti, B., Handen, B., Christian, B. T., Cohen, A., Tudorascu, D., Plante, D. T., Okonkwo, O., & Hartley, S. L. (2022). Physical activity and physical and mental health in middle-aged adults with Down syndrome. *Journal of Policy and Practice in Intellectual Disabilities*, 1– 11. https://doi.org/10.1111/jppi.12434

A special thanks goes out to all our participants in both the ABC-DS and Lifestyle studies.

Our research would not be possible without YOU!!

ABC-DS

Alzheimer Biomarkers Consortium – Down Syndrome

Interested in learning more about how you can get involved?

Visit https://www.nia.nih.gov/research/abc-ds

Or connect with us on social media!

@ABCDS100

@abc_ds_

@abc_ds_