Appendix 4

Positioning

Positioning to achieve stretch

Examples include:

- **Long sitting**: This stretches the hamstrings, as the knees are extended while the hips are flexed. For the younger child this can be done without a special seat, though a special seat that promotes the 90-degree angle of the hip and ties the knee in extension can be a great help. (See Figure A4.1.) If an AFO plus knee immobilizer are worn while the child is positioned in long sitting, stretch of both the calf and hamstring muscles can be achieved.

Figure A4.1 Long sitting.

- **Side sitting**: This gives a nice stretch to the side with the balancing hand. It also stretches the wrist if there is any upper extremity tightness. See Figure A4.2.

Figure A4.2 Side sitting.

- **Tailor sitting**: This stretches the hip adductors but also promotes hip external rotation. See Figure A4.3.

Figure A4.3 Tailor sitting.

- **Prone positioning**: This stretches the hip flexors. Prone propping is a position in which the child lies on their tummy with their feet out behind them and elbows on the floor. In prone lying, the elbows are straight. A triangular wedge is very handy to help promote this position. See Figure A4.4.

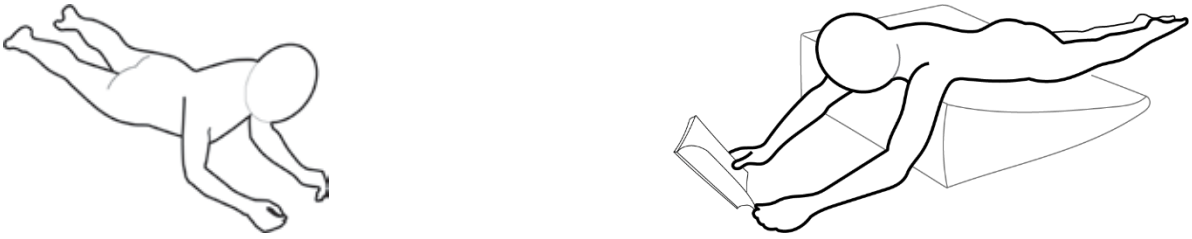

Figure A4.4 Prone propping.

- **Standing**: This stretches the hip flexors, the hamstrings (knee flexors), and the gastrocnemius and soleus muscles. This includes standing while holding on to furniture, standing with orthoses or knee immobilizers, and standing with various standing equipment. Sometimes the equipment allows children to stand on an incline, which helps stretch the gastrocnemius muscle.

Some positions for strengthening

Examples include:

- **Prone positioning** (prone propping; see explanation above): This position promotes shoulder stability and improves trunk control through core strengthening. Crawling involves movement while in a prone position.
- **Tailor sitting**: This promotes the development of trunk control (i.e., trunk strengthening and balance reactions). It also encourages more active play, and because the two hands are free, it encourages crossing the midline (using both sides of the body together).
- **Standing**: Standing strengthens trunk and leg muscles. Playing while standing is also important for developing balance reactions.
- **Side sitting**: This promotes the development of trunk control and balance reactions. It should be practiced evenly on both sides.

- **Sitting on a large roll or bolster with feet supported on the floor**: The child can play at a table in this position. The hips, knees, and ankles are at 90 degrees and both sides of the trunk are straight. This promotes the development of trunk control (i.e., strengthening the trunk muscles and balance reactions). It also encourages more active play, and because the two hands are free, it encourages crossing the midline. See Figure A4.5.

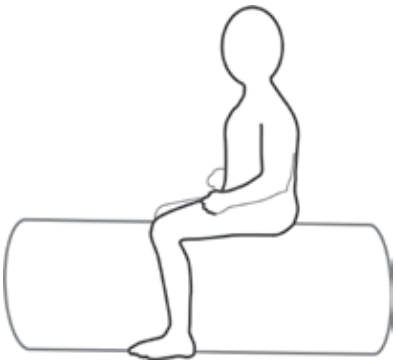

Figure A4.5 Sitting on a large roll.

- **Tall kneeling**: In this position, the child is bearing weight on their knees. The knees are flexed but the hips and trunk are extended. This position again promotes the development of trunk control and balance reactions, but because it is done in a kneeling rather than a sitting position, there is more work being done to oppose gravity. This is a good precursor to standing balance, and it is a good play position even if the child has already achieved standing. Some children also practice walking on their knees. See Figure A4.6.

Figure A4.6 Tall kneeling.

Appendix 5

Exercise and physical activity

There's a balance to be struck between preserving joints and allowing a child to play sports and do activities they most enjoy. For example, if playing soccer with friends is a favorite activity for a child, then it's a good sport for that child. Swimming is a particularly good sport because of its low impact on the joints.

Exercise and physical activity tips for the younger child

- The typically developing toddler gets their muscle stretching and strengthening exercises through everyday movement: running, climbing, jumping, etc. Since one of the goals is to follow typical development as much as possible (to get normal forces acting on the bones), the young child with spastic CP needs to get their required amount of exercise and physical activity. Movement is essential, including moving joints through the entire ROM the child is capable of.
- For the young child, learning to play and learning *through* play are very important. Incorporating exercise and stretching into the normal day as much as possible also helps—for example, encouraging the child to use a tricycle to travel short distances.
- Playgrounds (both outdoor and indoor) are great places for all children to play, but they are especially important for the child with CP. Here the child has the opportunity to move in a variety of ways. Playgrounds are also great because they are typical family settings. Parents of children with limited mobility sometimes tend to avoid taking them to venues that require a lot of movement, which is unfortunate because a child with CP needs such opportunities to move and play even more than the typically developing child. Safety is a concern, of course, but parents should avoid being so overzealous about safety that their child misses out on opportunities for movement.
- Swimming is a great activity for the young child with CP.
- Parents may be reluctant to use adaptive equipment (such as a recumbent bicycle) because they worry it will make the child stand out more. It's helpful to weigh the perceived costs (not financial) against the benefits for the child. Children can be very accepting of others; often the prejudice lies with adults, not with children.

Exercise and physical activity tips for the older child, adolescent, and adult

- For all types of exercise, an appointment with a physical therapist, occupational therapist, or a recreational therapist, is very useful. There are also wonderful athletic trainers who have advanced training in working with people with physical limitations. Trainers who lack this specialized training, however, may advise overexercising, which can lead to injuries. Consider calling the fitness centers or gyms in your area to check if any of their staff have training in adapting exercise programs for people with physical challenges.
- Expert guidance is recommended before working with weights. An experienced trainer or therapist can provide guidance on how much weight is safe and how many repetitions to perform.
- Fast walking can achieve many of the same benefits as running and may be safer for some people.

- Cycling offers many options, including outdoor and indoor (static) bikes. Three-wheeled bikes may be ideal for those with balance issues. An outdoor bike can be converted to an indoor (static) bike with the purchase of blocks (trainers) for that purpose. This is a great way to keep cycling when the weather doesn't allow for outdoor mobility.
- A therapist can offer guidance on the appropriate size and type of sports wheelchair to use and can advise on possible funding aid to purchase one.
- Swimming is an excellent option. A few tips for swimming:
    - Consider scheduling a few sessions with a physical, occupational, or recreational therapist to develop an appropriate swimming program.
    - Wheelchair users can call local pools to find one with PVC pool chairs and a ramp.
    - A pool with water temperature of 88 to 94 °F (31 to 34 °C) can be very therapeutic and can help reduce pain and stiffness.
    - Nonskid pool shoes are recommended for walking from the changing room to the pool and back to avoid falls on wet pool decks.
    - Swim paddles, kickboards, flippers, etc. can be used to increase resistance for muscle strengthening.
- Excellent videos online are available for exploring various activities such as adaptive yoga, tai chi, and more. The National Center on Health, Physical Activity, and Disability (nchpad.org) is a good resource.
- Incorporate as much exercise as possible into the normal day (e.g., cycling to school, after-school activities, work).
- Most school programs include at least a weekly session of physical education. Try to ensure that the program includes the child's or adolescent's needs as much as possible so they can participate, even if this means adapting the rules, the equipment, or the mindset of the teacher or coach. Forcing a child or adolescent to sit out their school physical education period is a missed opportunity both in terms of the benefits of exercise and the camaraderie and social experience of teamwork. Research has shown that school-based exercise programs are beneficial for children and adolescents with CP.