Cerebral palsy (CP) is a persistent disorder of movement and posture due to a defect in the developing brain in the prenatal or perinatal period. Etiologies of CP include: hypoxic-ischemic injury, congenital abnormalities from brain malformation or genetic disorders, prematurity, infections, and intracranial hemorrhage. CP can be classified by: 1) type of motor disorder (spasticity, dyskinesia, ataxia or mixed), 2) distribution of the motor disorder (hemiplegia, diplegia, quadriplegia) and 3) the severity of the mobility impairment. For more information: [www.ucp.org](http://www.ucp.org)

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| **Intelectual Developmental disorder (IDD)** | - The incidence of IDD is about 50% and variable in the population.  
- The degree of motor disability and dysarthria does not necessarily correlate with the degree of IDD.  
- Communication devices are often helpful. | - Review IQ testing, advanced directives, need for guardianship, and disability determination.  
- Refer to speech therapy for communication devices  
- Encourage community participation in work, dayhab, or condition-specific organizations. |
| **Hearing** | - Hearing loss is more common than in general population.  
- Cerumen impaction is common | - Review hearing loss symptoms  
- Examine ear canal regularly, offer cerumen removal  
- Refer for baseline hearing exam and if behavior/communication change |
| **Vision** | - Common vision problems: decreased acuity, strabismus, cataracts, and cortical blindness | - Refer for screening every 2-5 yrs. Optometry schools may offer clinics for patients with disabilities. |
| **Dental** | - Dental caries are common due to poor hygiene, enamel hypoplasia, reflux  
- Periodontal disease is common due to poor hygiene and seizure medications  
- Other problems: bruxism, excessive salivation | - Refer for dental checks every 6 months, dental schools may provide sedation or behavior modification.  
- Screen for dental problem if pain/behavior change  
- Hyposalivation: glycopyrrolate, scopolamine, botox |
| **Cardiovascular** | - Coronary artery disease/HTN screen as per general population with conversation of risks and benefits with patient/family. In younger patients, consider work-up secondary causes of HTN.  
- Vasomotor abnormalities/dysautonomia can occur. Symptoms: Raynaud’s, skin flushing, BP/HR changes, sweating, dependent edema. | - Screen BP and lipids as per general population. Assure relaxed patient and proper fitting cuff for BP.  
- For vasomotor abnormalities: Evaluate for circulation, fracture, infection, and pain. Management: avoid excessive cold & hot, use low pressure compression stockings, diazepam can help with dysautonomia episodes. |
| **GU** | - Concerns: UTIs, neurogenic bladder, kidney stones especially with some seizure meds (zonisamide) | - Review for infrequent voiding (>6-8 hrs, needs cath), UTI (behavior change/fever), stones symptoms. |
| **Bone health** | - Osteoporosis risks: wheelchair dependency, antiepileptics, antipsychotics, low testosterone or estrogen, poor nutrition, low calcium/vit D, chronic steroids, medroxyprogesterone  
- Common fractures sites: long bones (femur/tibia) and spine | - Evaluation: 25 hydroxy-vitamin D, calcium. Bone turn-over markers may be considered: PTH, CTX, P1NP. DEXA scan every 2-5 years if able.  
- Treat vit D (goal >40), encourage weight bearing activity if able, Ca 1200 mg/ vit D 1000 IU daily, consider bone modulators if Ca and vit D normal. |
| **Neuro** | - Seizures are common. Onset is usually in infancy/early childhood and related to neuro trauma or poor development. | - Review: type, freq/duration, changes.  
- Refer to Neurology: for management as needed  
- Order labs for med side effect and levels annually  
- Order rectal diazepam to give for seizures > 5 min |
| **Skin** | - Skin ulcer risks: hospitalization, ill-fitting or new equipment, transfer shearing, positioning | - Review risk factors and skin exam  
- Prevention: OT/PT for mobility, skin checks, evaluate equipment, position change every 1-2 hrs |
| **Mental health** | - Concerns: anxiety, depression, body image, sexuality  
- Behavioral change: can occur with medical problem (dental, infection, constipation, pain, fracture, med side effect, mood disorder) or environmental stress | - Routinely assess: mental health and behavior  
- Evaluate: medical and environmental concerns |
### Pulmonary

- **Common problems:** aspiration pneumonia (pna), bronchiectasis, restrictive lung disease, central or obstructive apnea
- **Aspiration pna risks:** dysphagia, inconsistent food textures, rapid eating/feeding, being fed by others, drooling, inability to sit upright, scoliosis, seizures, poor cough, and hiatal hernia
- **Restrictive lung disease risks:** scoliosis, poor respiratory effort. Consider PFTs to document if able.
- **Apnea signs:** 1) symptoms: behavior change, seizures, or observed apnea or 2) labs: elevated bicarb and polycythemia
- **Recurrent pneumonia:** Often due to gram negatives and possibly anaerobes from aspiration. If trach/vent dependent or have recurrent hospitalizations may be colonized with staph or pseudomonas
- **Review possible equipment needs:** neb machine, masks, suction, catheters, pulse ox, ambu bag, cough assist, O2. Patient should have checklist of portable equipment needed.
- **Refer to pulmonary and ENT as needed**

### GI

- **Weight risks:** 1) obesity if decreased activity 2) malnutrition/underweight if increased movement or poor intake.
- **Dysphagia** may develop with aging. **Symptoms:** pocketing food in cheeks, coughing, choking, pneumonia, weight loss.
- **GERD symptoms:** behavioral problems, coughing, drooling, food refusal, waking up at night.
- **Constipation symptoms:** behavior change, food refusal, overflow diarrhea. **Risks:** decreased water/fiber, med side effects, decreased mobility, age.

### Reproductive health

- **Women:** Concerns: amenorrhea, oligomenorrhea, menorrhagia/dysmenorrhea, menstrual behavioral changes, and difficulty with hygiene. Periodic external exams can be considered if not sexually active, but if problem, then pelvic exam needed. Age-typical exams needed if sexually active.
- **For hormonal therapy:** Medroxyprogesterone is not preferred due to osteoporosis risk. Risk of DVT with estrogen is not increased in chronic immobility, but other risk factors: family hx, smoking, inflammation, and infection should be reviewed.
- **Men:** Concerns: may have erectile/ejaculation dysfunction depending on neurological deficit. Undescended testes increase testicular cancer risk.

### Musculoskeletal

- **Scoliosis/kyphosis, contractures, and hip dislocation** worsen with age. May impair proper seating, transfer, dressing, & hygiene and cause pain.
- **Dyskinesia/Choreathetosis** (involuntary movements) increase calorie use. Carbidopa-Levodopa may help.
- **Muscle relaxants and Benzodiazepines** are used for spasticity. Baclofen pumps may be placed by neurosurgery and managed by PM&R or neurology. **Withdrawal symptoms (WD):** anxiety, HTN, hyperpyrexia, increased spasticity, rhabdomyolysis. **Overdose symptoms (OD):** drowsiness, hypotonia, slurred speech, vertigo, hypotension
- **Review function (ADLs/IADLs), pain, equipment needs** (wheelchair, bracing, beddings, hoyer lift, bath chairs)
- **Refer to PT/OT** for pain, adaptive devices, seating
- **Refer to PM&R or neurology** for spasticity and dyskinesia management and baclofen pump
- **Refer to orthopedics:** contractures with mobility impairment
- **Muscle relaxant OD/WD** can be a medical emergency, PM&R &/or neurosurgery need to be involved often in a hospital setting. If baclofen pump, assure patients have oral baclofen 10 mg to give every 6 hrs and know to call immediately if WD.

### Review

- ** hx of pna, dysphagia, ability to cough, increased secretions, allergies**
- **If pna:** 1) get a sputum culture, 2) consider abx coverage for pseudomonas, gram negatives, anaerobes, or staph, 3) increase airway clearance
- **Consider 2-4 wk cycles of tobramycin nebs BID** if recurrent pseudomonas or gram negative infections
- **If aspiration pna:** 1) consider swallow study with speech therapy, 2) 90 degree feeding position 3) increase feed duration (may need feeding pump), 4) treat gas (vent g-tube) and constipation, (5) treat allergies and excessive oral pharyngeal secretions
- **If poor cough or copious secretions:** Airway Clearance (1-2x daily if well, 3-4x daily if sick):
  1) **open-it up:** bronchodilator, wait 3 minutes
  2) **break-it up:** mucolytic, hypertonic saline 3.5%- 7% (if wheezing, don’t use as it can be irritating)
  3) **cough-it up:** airway clearance: high frequency chest wall oscillation(VEST), cough assist, patting
  4) **suction-it out:** spit or oral/deep suction (assure catheters and suction machine at home)
- **Review weight, eating & bowel habits at each visit**
- **Nutrition:** if concern for deficit, check labs. People with immobility need about 1000-1200 kcal per day.
- **Dysphagia:** get swallow study with speech therapy, may need g-tube, monitor hydration when ill.
- **GERD:** start with PPI and slow down feeds. If treatment fails or severe pain/bleeding, get EGD.
- **Constipation:** KUB for evaluation. For treatment consider daily polyethylene glycol +/- mini enema or suppository. Titrate to 1 soft BM daily. If vomiting or obstruction, evaluate for obstruction.