PEDIATRIC NURSING • NGN NCLEX 2026

Neural Tube *Defects*, decoded.

A high-yield side-by-side of the three spinal dysraphism types every pediatric nurse must know — with management priorities and family teaching pearls for the Next Gen NCLEX.

TOPIC · NEURO / GU
CLIENT NEED · PHYS. ADAPT.
DIFFICULTY · ★ ★ ★ ★ ☆

STUDY SHEET № 07

WHAT IT IS

A **Neural Tube Defect (NTD)** — incomplete closure of the vertebral column &/or spinal cord. Occurs ~ **week 3–4 of gestation**, before many women know they're pregnant.

RISK FACTORS

Low folate intake · maternal **diabetes** · **valproic acid** / carbamazepine · obesity · hyperthermia in early pregnancy · family hx · Hispanic ethnicity.

PREVENTION

Folic acid — **400 mcg/day preconception** for all women of childbearing age; **600 mcg/day** during pregnancy; **4 mg/day** if prior NTD-affected pregnancy.

01 The Three Types — Visual & Clinical Breakdown

TYPE I

MILDEST

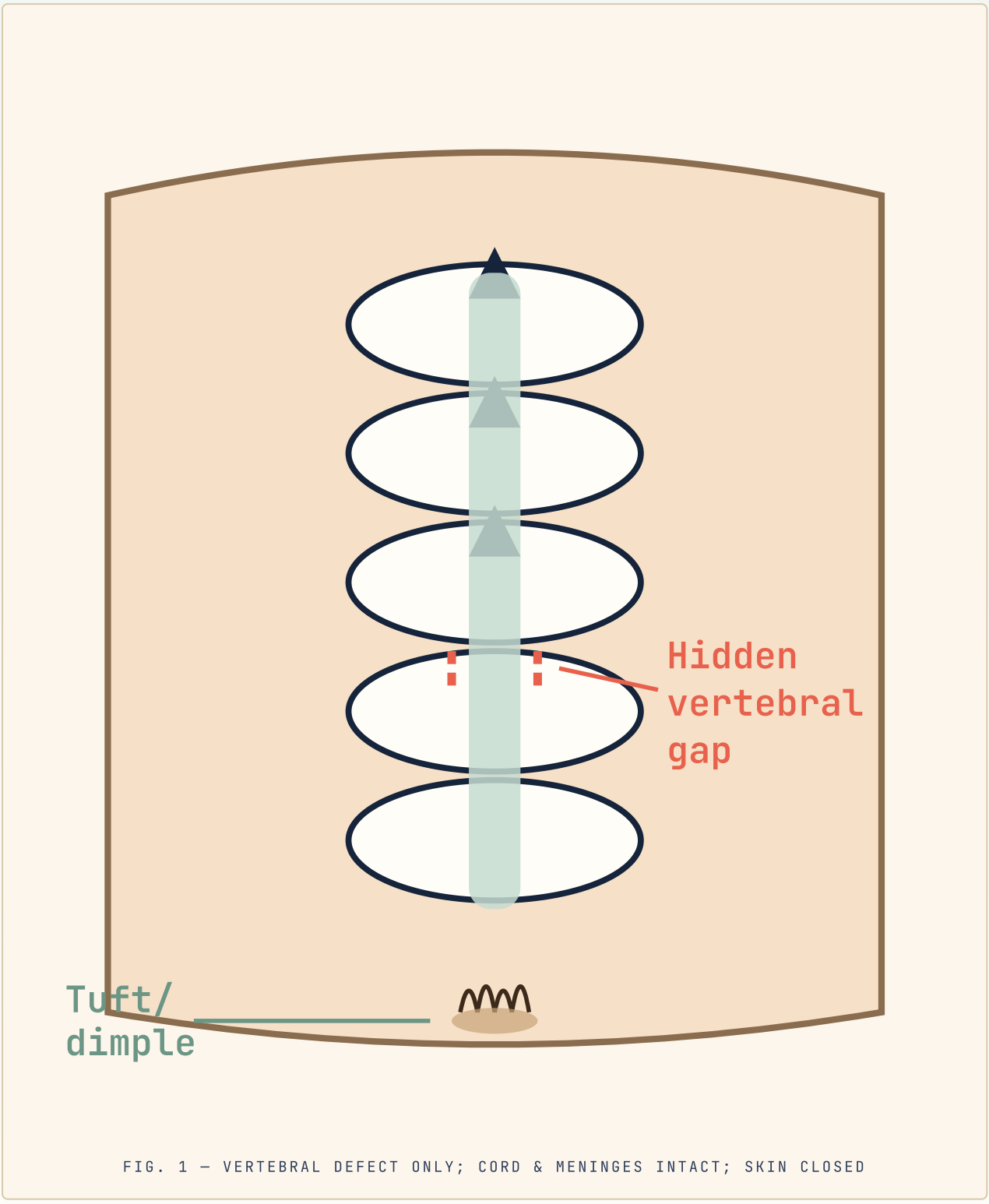

FIG. 1 — VERTEBRAL DEFECT ONLY; CORD & MENINGES INTACT; SKIN CLOSED

Spina Bifida Occulta

"HIDDEN" · NO SAC · MOST COMMON · USUALLY ASYMPTOMATIC

Defect: Incomplete fusion of **vertebral arch only** — typically L5–S1. The spinal cord and

meninges remain in place and intact skin covers the defect. No visible sac.

⚑ CLINICAL CLUES

- **Dimple** or small sinus at lumbosacral area
- **Tuft of hair** over lower spine
- Port-wine stain, hemangioma, or lipoma
- Usually **no neuro deficit**

⚕ MANAGEMENT

- Typically **no treatment** needed
- Spine x-ray / MRI confirms
- Monitor for **tethered cord** syndrome
- Surgery only if neuro symptoms develop

♥ PARENT TEACHING

- **Reassure** — often benign, normal life expectancy
- Report new: leg weakness, gait change, bladder/bowel issues
- No activity restrictions unless symptomatic
- Genetic counseling & folic acid for future pregnancies

TYPE II

MODERATE

TYPE II MODERATE

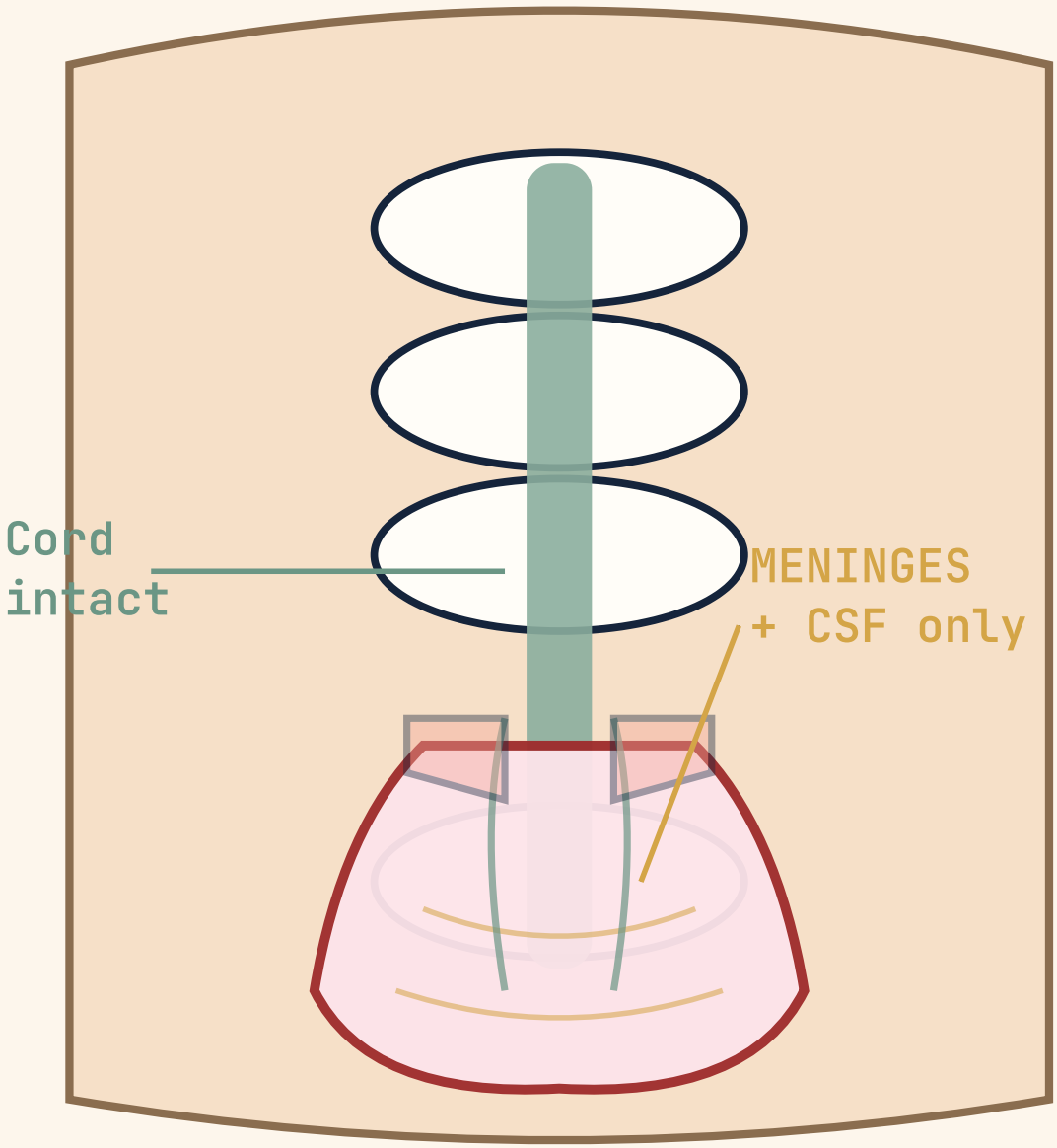

FIG. 2 — SAC CONTAINS MENINGES & CSF; SPINAL CORD STAYS INSIDE CANAL

Meningocele

"MENINGES OUT" · SAC PRESENT · CORD INTACT · USUALLY NO DEFICIT

Defect: A visible sac protrudes through the vertebral opening containing **meninges and cerebrospinal fluid (CSF) only** — spinal cord and nerve roots remain inside the canal. Neurologic function usually preserved.

⚕ MANAGEMENT — PRE-OP / PERI-OP

- Position **prone** or side-lying — never on the sac
- Cover sac with **sterile, moist, non-adherent saline dressing**
- Keep sac **moist** — prevent drying & rupture
- Strict **latex-free** environment from day 1
- Measure **head circumference daily** — watch hydrocephalus
- Surgery **within 24–72 hours** of birth to close
- Post-op: **prone** positioning, monitor incision, pain mgmt

♥ PARENT TEACHING

- **Latex allergy** risk lifelong — avoid balloons, latex gloves, pacifiers
- Signs of ↑ **ICP / hydrocephalus**: bulging fontanel, high-pitched cry, vomiting, ↑ head circumference, sunset eyes
- Incision care: keep clean/dry, **no diaper over site** until healed
- Expected prognosis is excellent — most reach normal milestones
- Folic acid for future pregnancies; genetic counseling offered

TYPE III

MOST SEVERE

TYPE III

MOST SEVERE

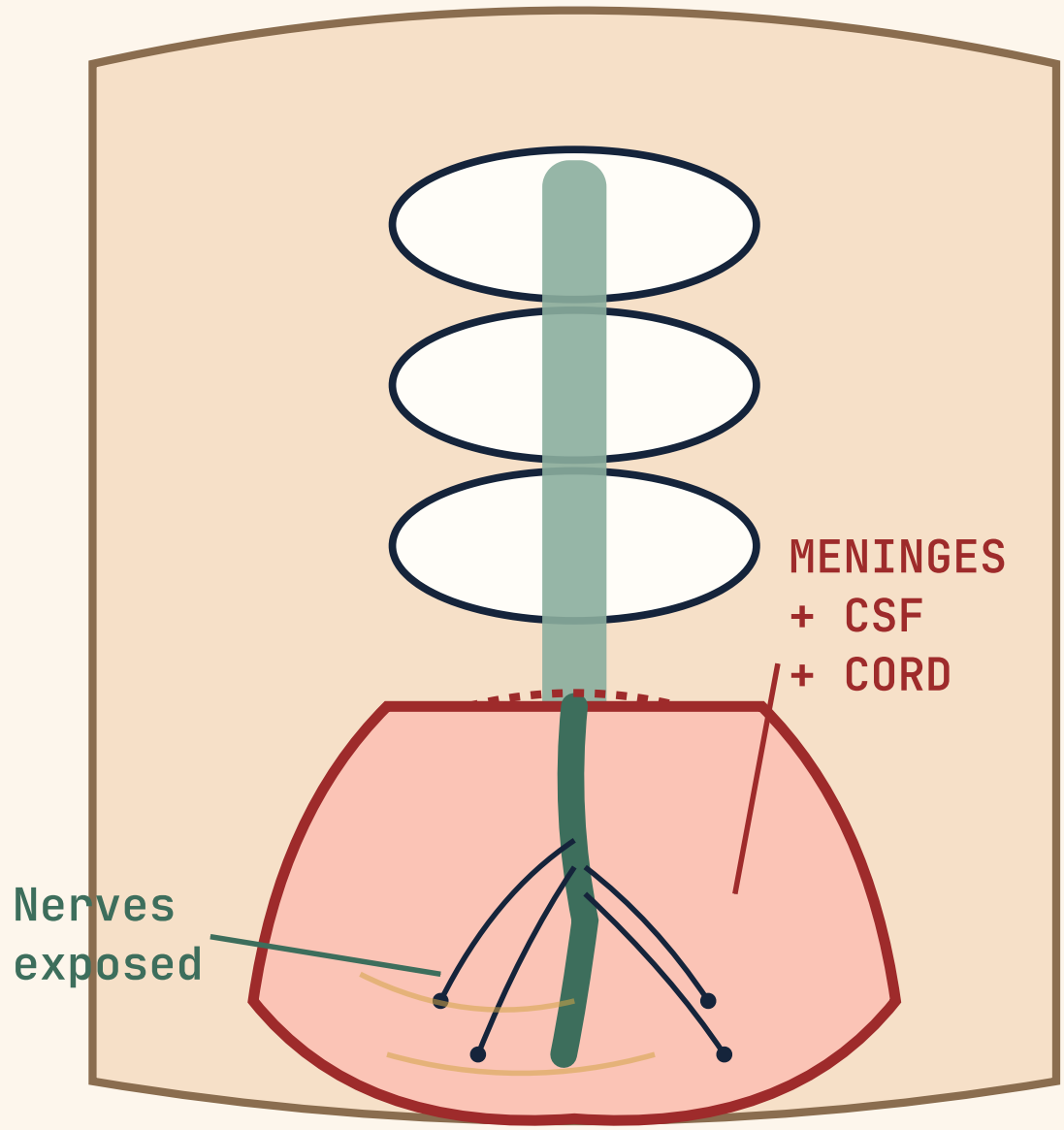

FIG. 3 — SAC CONTAINS MENINGES, CSF, AND SPINAL CORD/NERVE ROOTS

Myelomeningocele

"CORD & MENINGES OUT" · MOST SERIOUS · NEURO DEFICITS BELOW LESION · EMERGENCY CARE

> **Defect:** Sac protrudes containing **meninges, CSF, AND spinal cord / nerve roots**. Results in neurological impairment below the level of the lesion — flaccid paralysis, loss of sensation, neurogenic bladder & bowel. Almost always accompanied by other complications.

◆ ASSOCIATED CONDITIONS

- **Hydrocephalus** (80–90%) → VP shunt needed
- **Chiari II malformation** (cerebellum displaced)
- **Neurogenic bladder & bowel**
- Lower extremity **paralysis / paresis**
- Orthopedic: clubfoot, hip dysplasia, scoliosis
- Learning disabilities; **latex allergy** in ~70%

⚑ ASSESSMENT PRIORITIES

- **Head circumference** daily — ↑ = hydrocephalus
- Measure & describe sac; note leakage / rupture
- Neuro check: movement & sensation of lower extremities
- Bladder scan / Credé — assess urinary retention
- Monitor for **meningitis**: fever, lethargy, poor feeding
- Skin integrity below lesion (impaired sensation)

⚕ MANAGEMENT — CRITICAL PRIORITIES

- **PRONE position** — never supine; protect the sac
- **Sterile, moist, non-adherent saline dressing** on sac — change q2h
- **LATEX-FREE** environment at ALL times
- NPO & IV fluids pre-op; broad-spectrum antibiotics
- **Surgical closure within 24–72 hours** to prevent infection
- Fetal surgery (18–26 wk gestation) — reduces hydrocephalus risk
- C-section delivery preferred — avoids sac trauma
- Post-op: prone, then side-lying; **VP shunt** if needed

♥ PARENT & LONG-TERM TEACHING

- **Clean intermittent catheterization (CIC)** q3–4h — teach family
- Bowel program: fiber, fluids, scheduled toileting, suppositories
- **Lifelong latex avoidance** — medical alert bracelet
- Skin care: reposition q2h, inspect daily, pressure relief
- Recognize **shunt malfunction**: vomiting, irritability, ↓LOC, bulging fontanel
- Encourage mobility: PT/OT, braces, wheelchair as needed
- Multidisciplinary follow-up: neurosurgery, urology, ortho, PT
- Promote **independence**; normal cognition is possible
- Folic acid 4 mg/day for mother in future pregnancies

02 At a Glance — Quick Compare

OCCULTA

0

Zero sac · zero deficit (usually)
Just a bony gap under intact skin

MENINGOCELE

2

Two things in the sac:
meninges + CSF. *Cord stays home.*

MYELOMENINGOCELE

3

Three things in the sac:
meninges + CSF + *spinal cord*

⚠ CRITICAL NURSING PRIORITIES — ALWAYS

The Four Non-Negotiables for any Open Sac

1 · Prone Position

Newborn stays **prone** (or side-lying). Never supine. Never diaper over sac.

2 · Moist Sterile Dressing

Cover with **sterile saline-moistened non-adherent** gauze. No dry dressings. No ointments.

3 · Latex-Free From Birth

Due to repeated exposure risk — strict **latex precautions** for life. Medical alert.

4 · Prevent Infection

Monitor for **meningitis** & CSF leak. Surgery within **24–72 hr**. Sterile technique always.

↑ ICP / Hydrocephalus in Infants

KNOW THESE SIGNS COLD · ESPECIALLY POST-VP SHUNT

HEAD	Bulging anterior **fontanel**, widening sutures, ↑ head circumference
EYES	**Sunset eyes** (downward-gazing), pupil changes
CRY	**High-pitched**, shrill cry
FEEDS	Poor feeding, **projectile vomiting**
BEHAV.	Irritable OR lethargic, ↓ LOC
LATE	Bradycardia, apnea, seizures → **emergency**

Latex Allergy — A Lifelong Story

UP TO 70% OF SPINA BIFIDA PTS DEVELOP IT — THINK AHEAD

- ⚠ **Avoid:** balloons, latex gloves, pacifiers, rubber bands, some tapes
- ⚠ **Cross-reactive foods:** banana, avocado, kiwi, chestnut
- ⚠ **Hospital:** ask for latex-free cart — IV tubing, BP cuffs, catheters, ports
- ⚠ **Home:** silicone / vinyl alternatives; read labels
- ⚠ **Emergencies:** medical alert bracelet + EpiPen available
- ⚠ **Cause:** repeated exposure via CIC & surgeries sensitizes early

NGN NCLEX Strategy — Test-Day Tells

WHAT THE ITEM WRITERS ARE REALLY ASKING

Q **"First action" on newborn with open sac?**
→ Cover with **sterile moist saline dressing** and position **prone**. Not feeding, not vitals first.

Q **"Best position" post-op?**
→ **Prone** or side-lying. Keeps pressure off the incision site.

Q **Priority assessment?**
→ **Head circumference** & fontanel — hydrocephalus is the most common comorbidity.

Q **Teaching on prevention?**
→ **Folic acid 400 mcg/day** to ALL women of childbearing age — *before* pregnancy.

Q **Diet during pregnancy?**
→ Leafy greens, fortified cereals, legumes, citrus — plus supplement.

Q **Prenatal detection?**
→ ↑ **maternal serum AFP** (15–20 wk), fetal ultrasound, amniocentesis.

Q **Parent reports bulging fontanel + vomiting post-shunt?**
→ Suspect **shunt malfunction** → notify provider immediately.

Q **Why C-section?**
→ Prevents **trauma/rupture** of the sac during vaginal delivery.

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