Maternal Myotonic Dystrophy and Pregnancy

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Myotonic Dystrophy

- DM1
  - Distal muscle weakness and wasting
  - Facial muscle involvement
    - Ptosis
    - Tent-shaped mouth
  - CTG trinucleotide repeat DM protein kinase gene (DMPK)

- DM2
  - Proximal muscle weakness of lower limbs
  - Later onset and more favorable course
  - CCTG tetranucleotide repeat Zinc finger 9 protein gene (CNBP)

- Phenotypes of DM1 and DM2 overlap somewhat

Myotonic Dystrophy Type I
DM1

- Most common heritable neuromuscular disorder
  - 1 in 8,000
- Progressive muscle weakness and wasting
- Myotonia
- Cataract Formation
- Endocrine abnormalities
  - Diabetes mellitus
  - Gonadal dysfunction in men

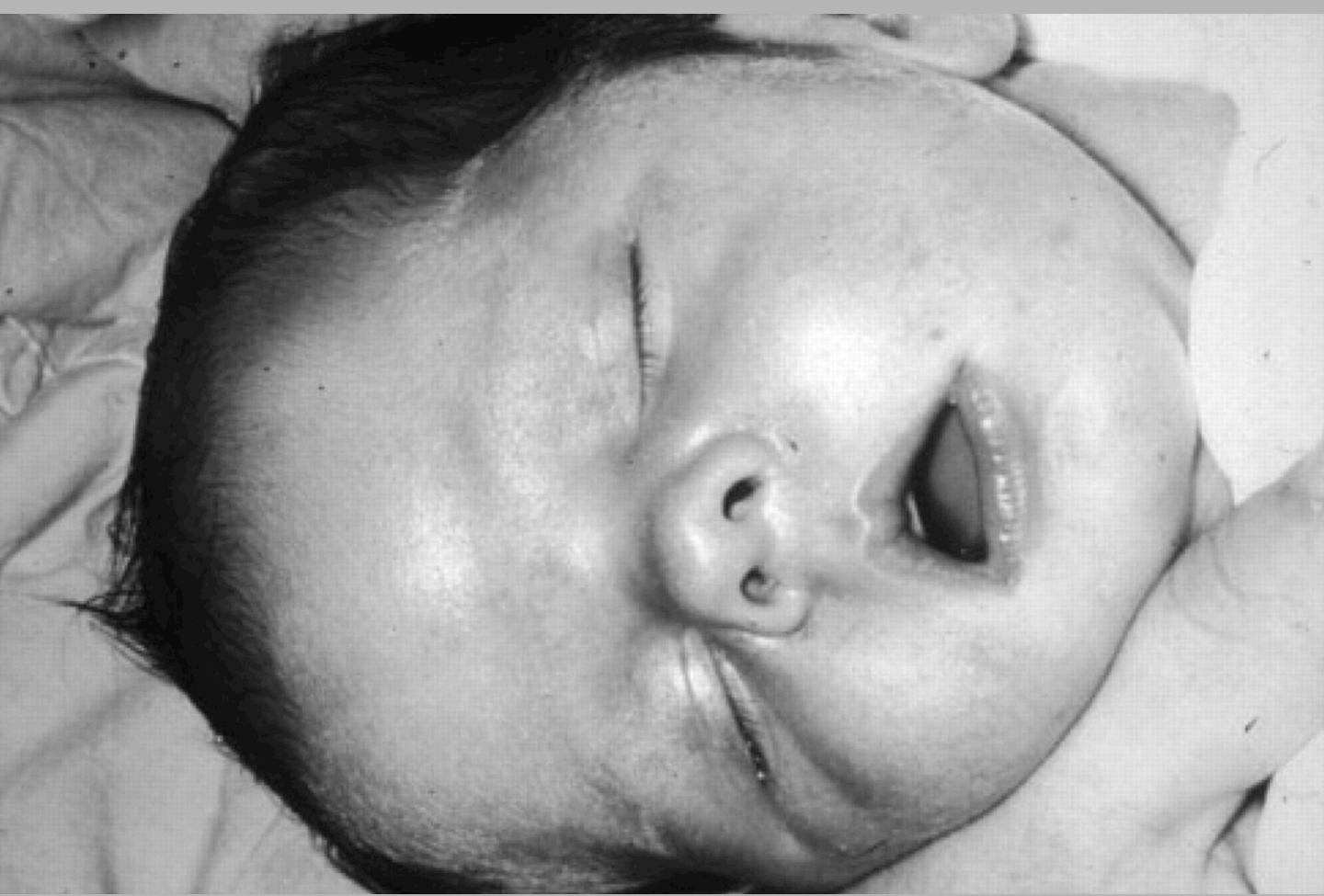
Myotonic Dystrophy Type I
DM1

- DM1 is caused by a triplet repeat expansion (CTG) in non-coding region of the “myotonin” gene, the DM protein kinase gene (DMPK) at 19q13.3
- Normal repeat size 5 – 34
- Affected individuals have 50 – thousands of repeats
  - Severity correlates with number of repeats
- Congenital form nearly always occurs to an affected mother (i.e. rarely to an affected father)
  - Premutation alleles 35-49 repeats in unaffected parent

Myotonic Dystrophy Type I
DM1

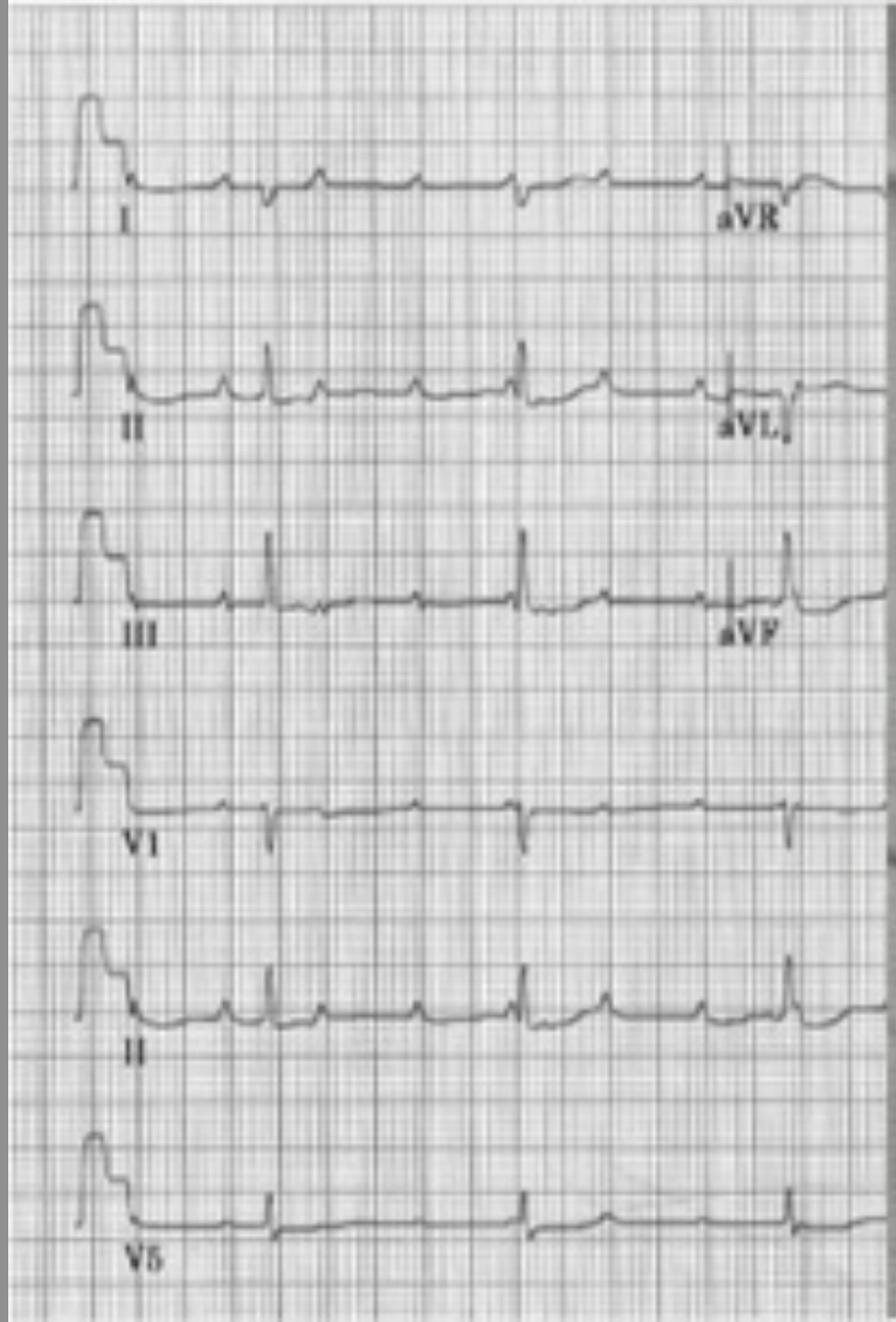
3 Types:

- **Mild**
- **Classic**
- **Congenital**



Congenital DM1
Neonatal Characteristics

- Floppy
- Facial diplegia and tent-shaped mouth
- Talipes
- Respiratory difficulties
  - Diaphragmatic hypoplasia
  - Improves with time
- 20% Neonatal Mortality
- GI Dysmotility
- Cerebral ventriculomegaly rarely requiring V-P shunt
- Survivors have significant learning disability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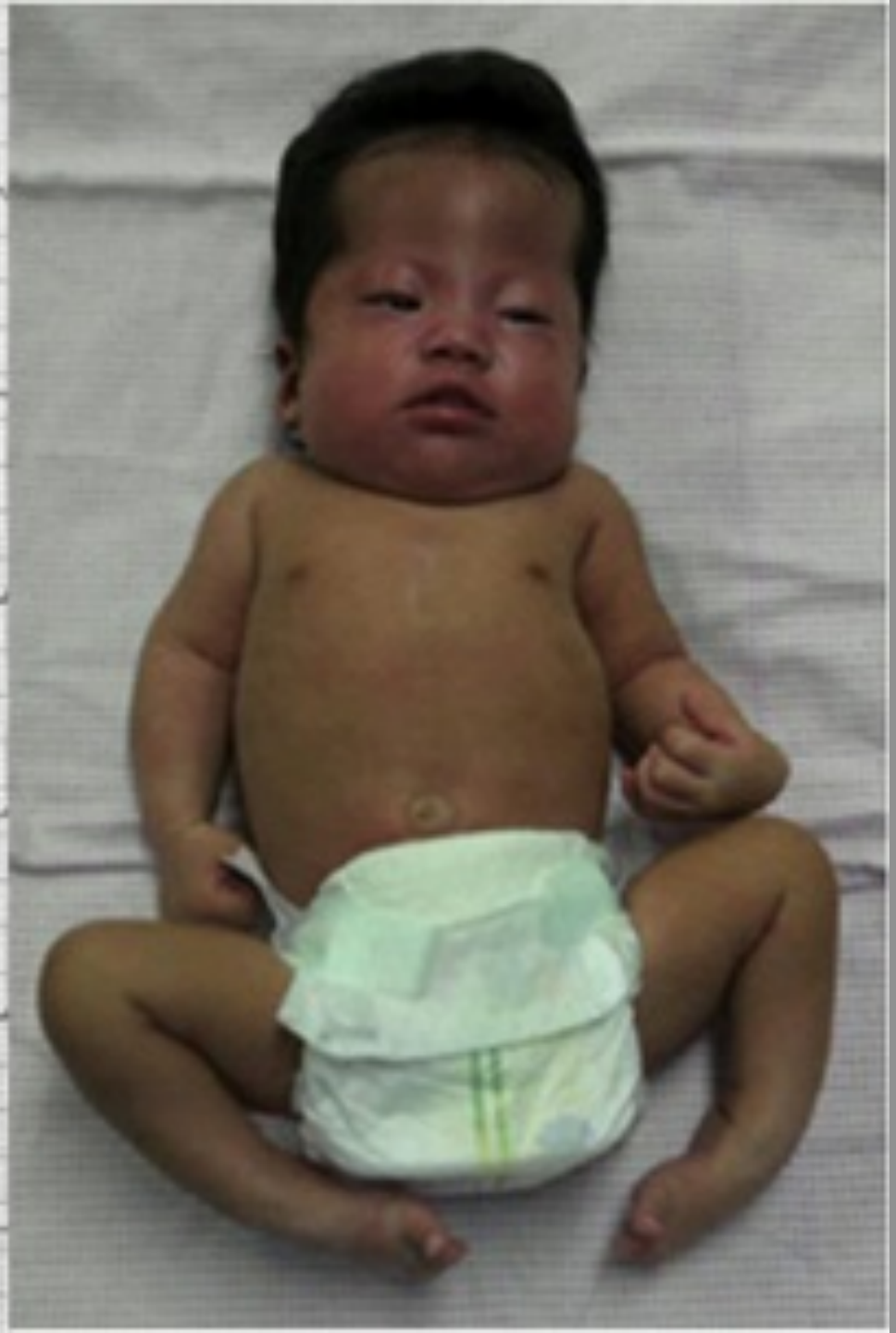

Classic DM1

Neurology / Volume 17 / February 1967

The effect of pregnancy on dystrophia myotonica

Anthony Hopkins, M.R.C.P., and Shirley Wray, M.R.C.P.

Maternal DM1 and Pregnancy

- Muscle weakness and myotonia stay the same or worsen
  - Usually manifests in third trimester, if at all
  - Progesterone effect?
  - Improves in the puerperium / postpartum

- Regular moderate exercise encouraged
  - Prolonged inactivity worsens symptoms

Maternal DM1 and Pregnancy

Caution (or avoidance) in use of Magnesium Sulfate

- **Anti-seizure prophylaxis for Preeclampsia**
- **Fetal "Neuroprotection" in Preterm Labor**
- **Tocolysis for Preterm Labor**

Maternal DM1 Anesthetic Considerations

- Impaired pulmonary ventilation may be aggravated by even small doses of respiratory depressants
- General anesthesia of particular risk
    - Exaggerated responses to paralytic agents
- Occasionally prolonged post-op intubation is required
- Diminished cough reflex increases risk for aspiration pneumonia
- Cardiac arrhythmias associated with DM1

DM1 and Cardiac Arrhythmias

- **Intraventricular Conduction Defects**
- **First-degree Heart Block**
- **Non-sustained Supraventricular Tachycardia**

  and

  Non-sustained Ventricular Tachycardia

  } **Both more common in DM2**

- ***Risk of sudden cardiac death.***
- **ECG and Holter monitoring are recommended.**

Acta Obstet Gynecol Scand 65:667–668, 1986

CASE REPORT

OBSTETRIC COMPLICATIONS AS THE FIRST SIGN OF MYOTONIC DYSTROPHY

Ditlev Fossen and Leif Gjerstad

From the Department of Obstetrics & Gynecology, Sarpsborg Sykehus, Sarpsborg, and the Department of Neurology, Rikshospitalet, The National Hospital, University of Oslo, Oslo, Norway

Maternal DM1 and Pregnancy

Problems can occur in all 3 stages of labor & postpartum

- **Attributable to generalized muscle weakness and *decreased myometrial contractility***
- **Increased risk for cesarean section and postpartum hemorrhage**
  - **Failure to progress**
  - **Failure to descend**
  - **Uterine atony**

Maternal DM1 and Pregnancy

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The affected congenital DM1 fetus *also* promotes maternal obstetrical complications.

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The affected congenital DM1 fetus *also* promotes maternal obstetrical complications.

Many pregnant women with DM1 are undiagnosed!

Lesson of the Week

Do you shake hands with mothers of floppy babies?

T H H G KOH

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In utero **the fetus with Congenital DM1 presents in a very similar way as the neonate.**

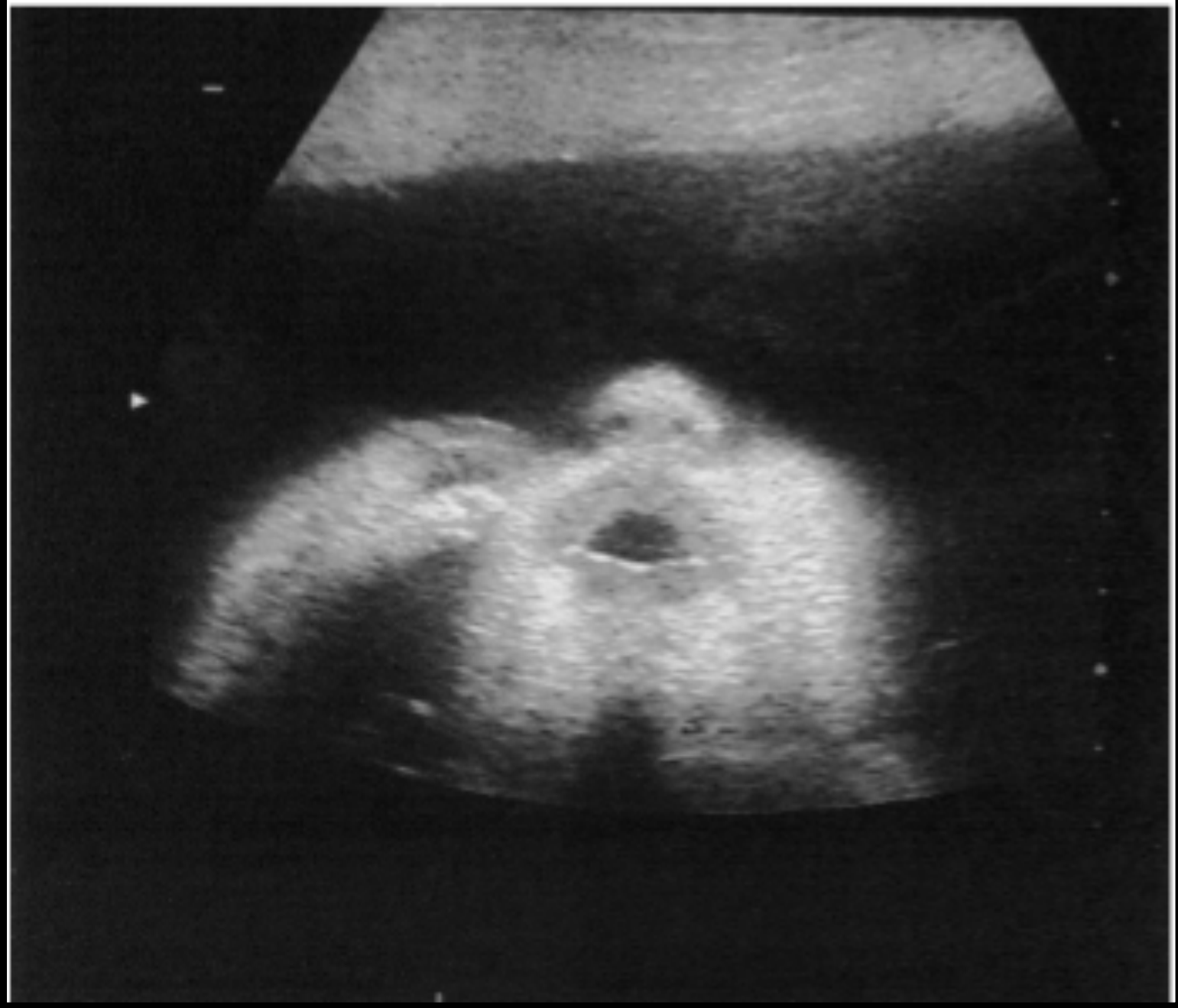
Most women experience decreased fetal movement.

This and the other fetal manifestations are able to be visualized by prenatal ultrasound.

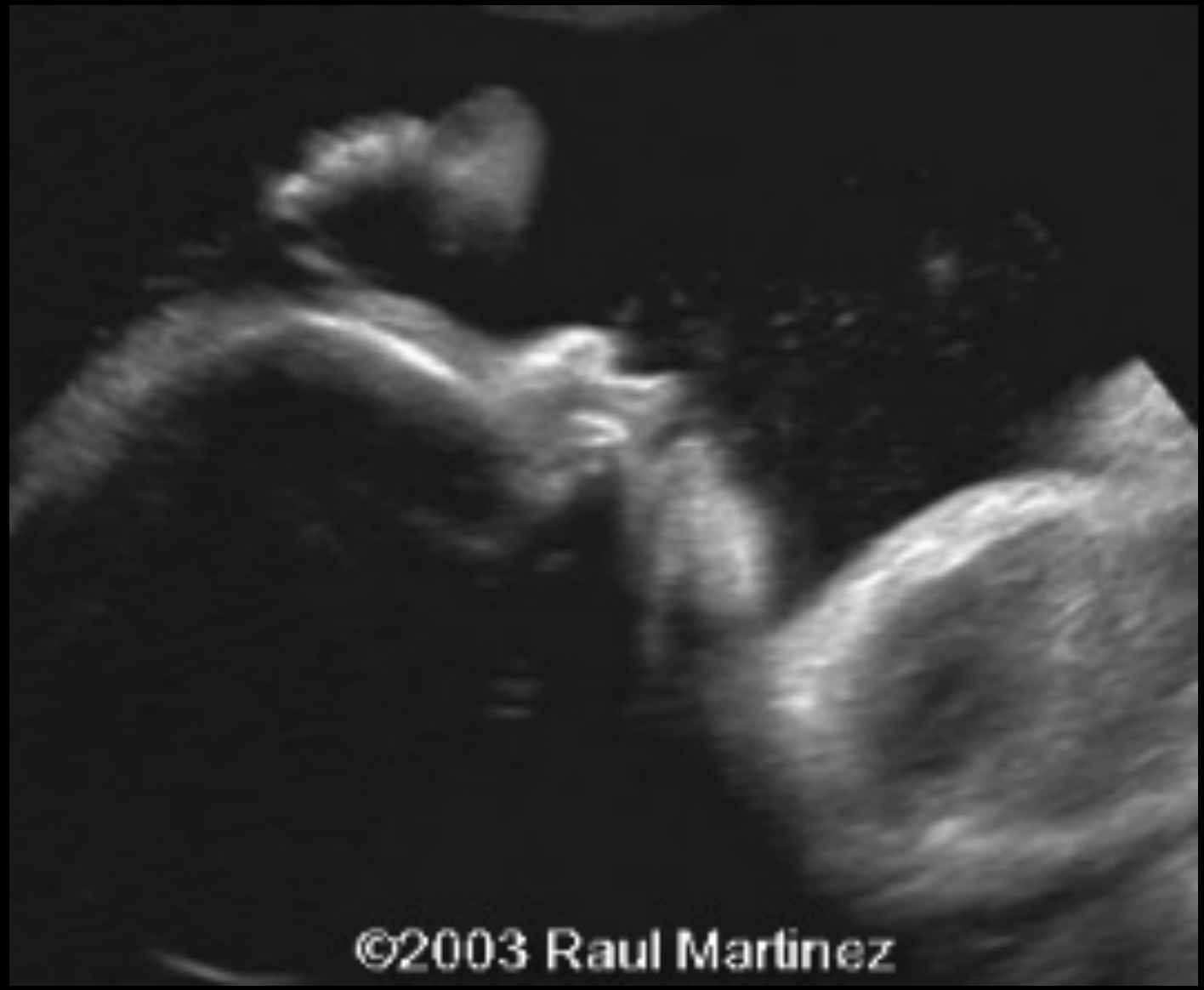
Fetal Effects of Congenital DM1

Fetal hypotonia/myotonia leads to:

- **Decreased fetal movement**
  - **Facial diplegia and tent-shaped mouth**
  - **Talipes**
  - **Breech presentation**
- **Decreased fetal swallowing**
  - **POLYHYDRAMNIOS**



Mashiach, Rimoin and Achrion Ultrasound Obstet Gynecol 20: 312-313, 2002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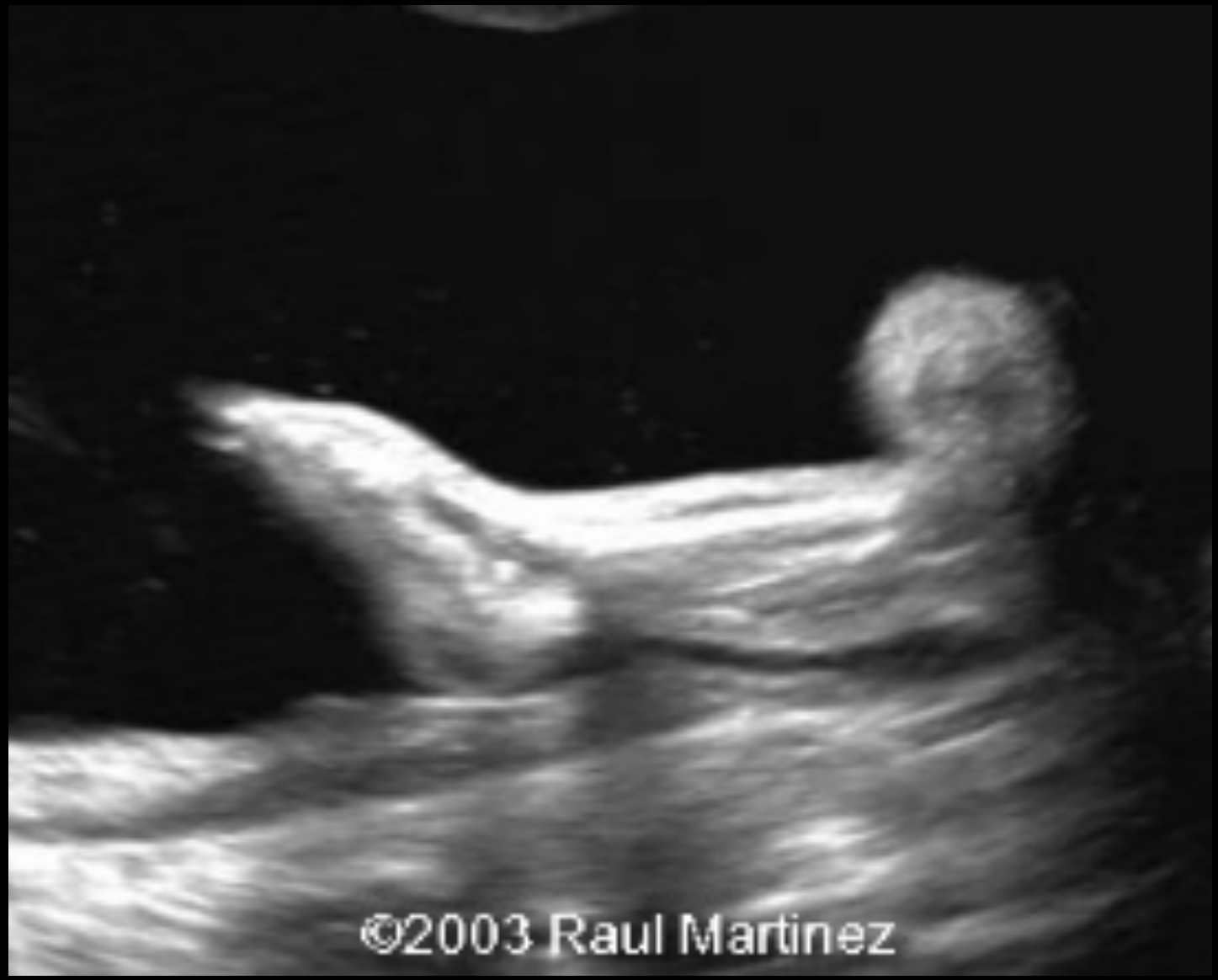
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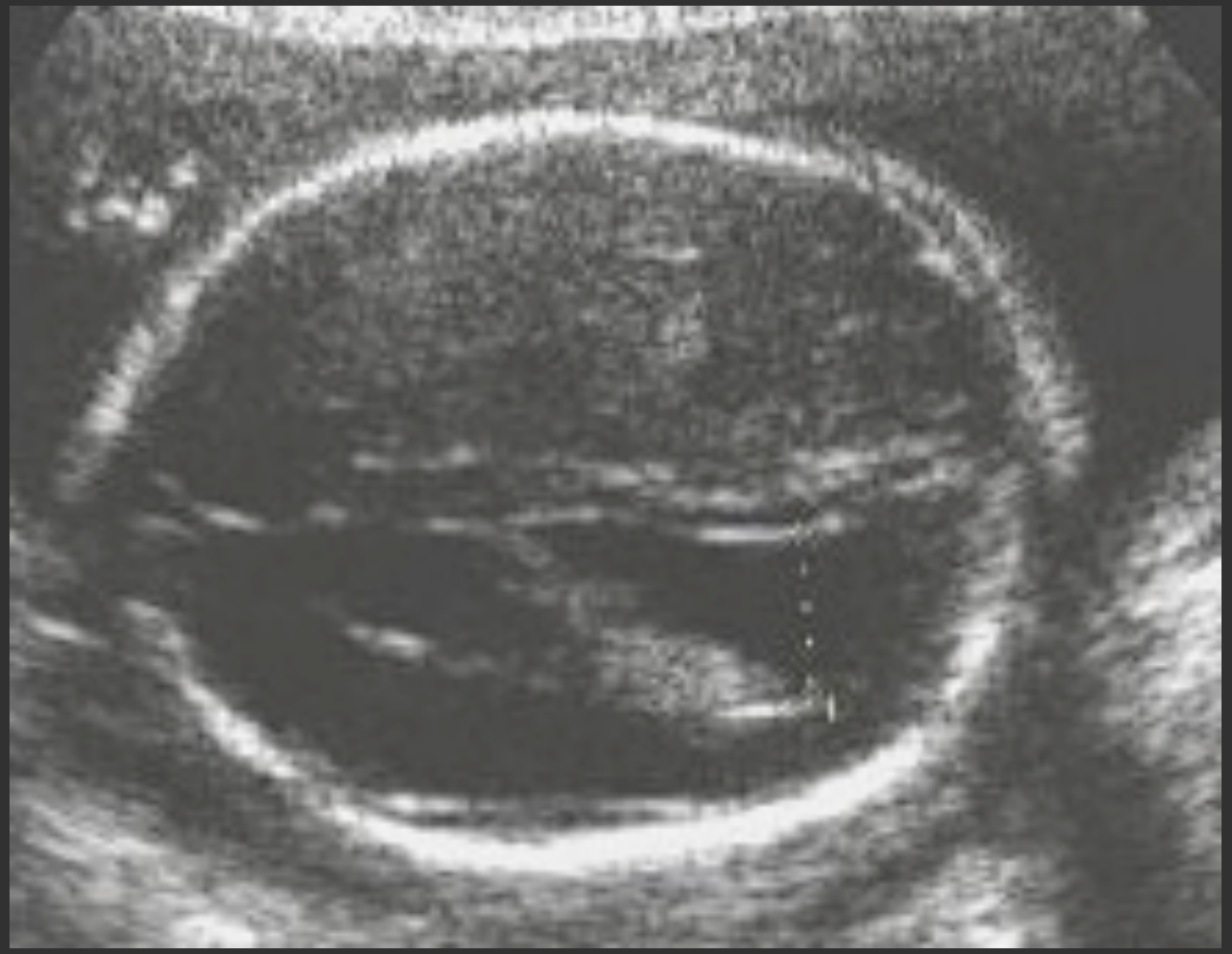


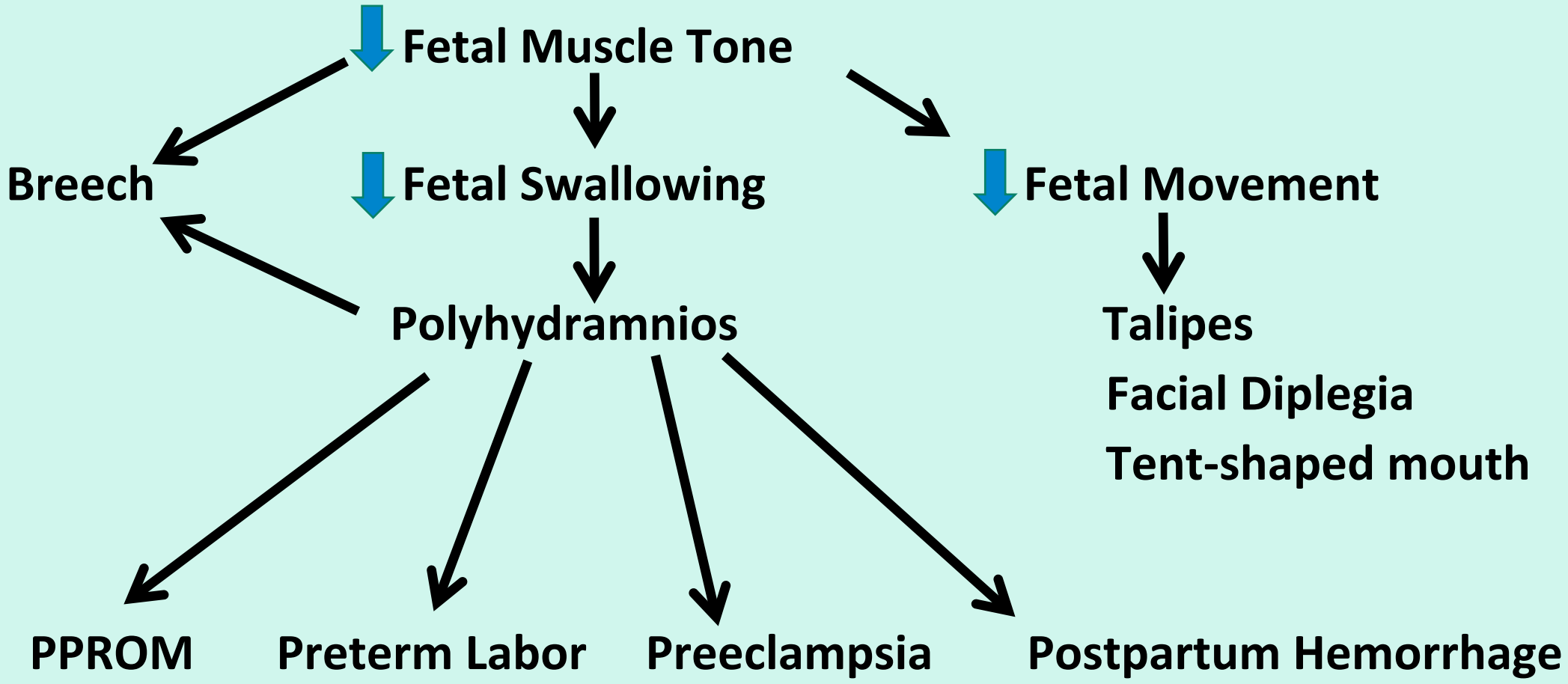
Mild Cerebral Ventricluomegaly

Fetal Effects of Congenital DM1 on Obstetrical Outcomes

Fetal hypotonia/myotonia leads to:

- **Decreased fetal movement**
  - **Facial diplegia and tent-shaped mouth**
  - **Talipes**
  - **Breech presentation**
    - **Increased cesarean section rate**
- **Decreased fetal swallowing**
  - **POLYHYDRAMNIOS**
    - **Preterm Premature Rupture of Membranes (PPROM)**
    - **Preterm labor**
    - **Preeclampsia**
    - **Uterine Atony**
      - **Postpartum Hemorrhage**

Affected Congenital DM1 Fetus



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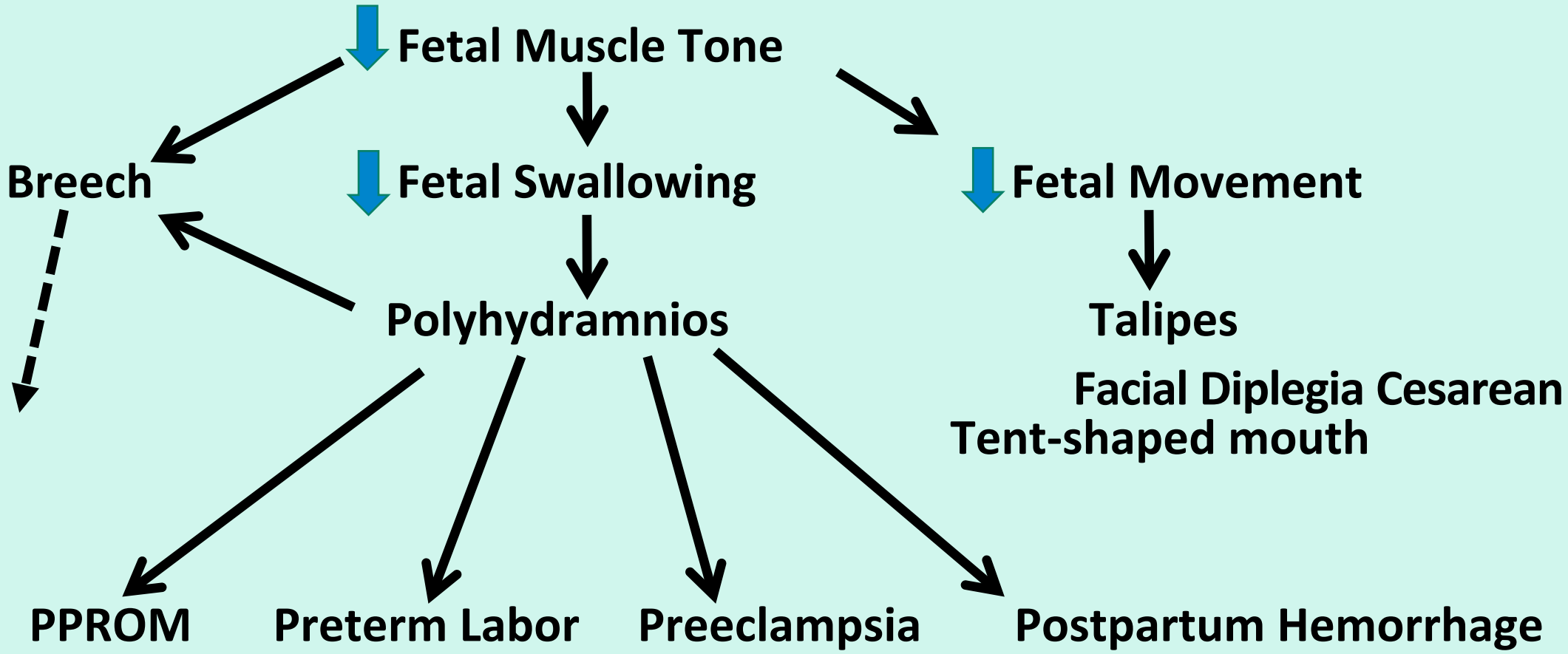
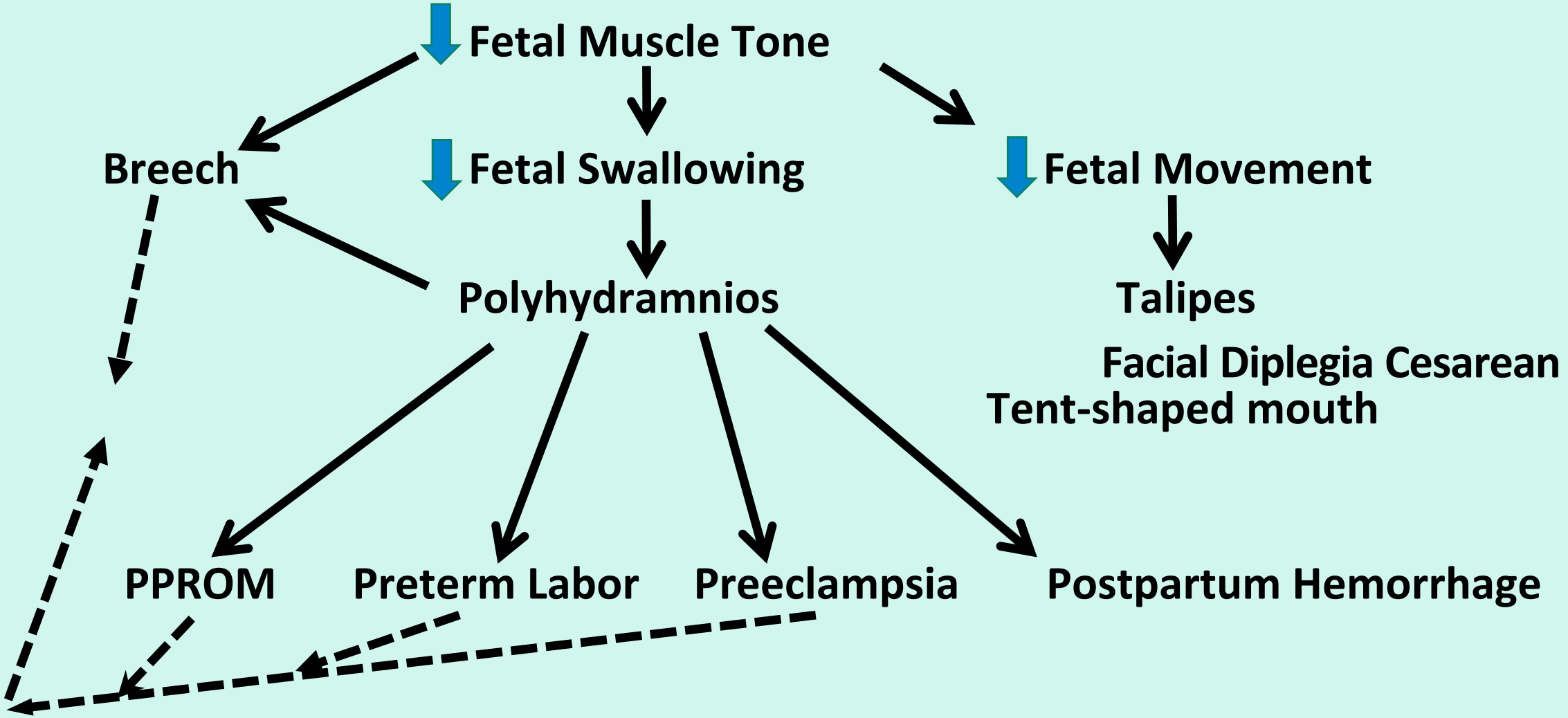


Affected Congenital DM1 Fetus



Affected Mother (Symptomatic)

Fatigue

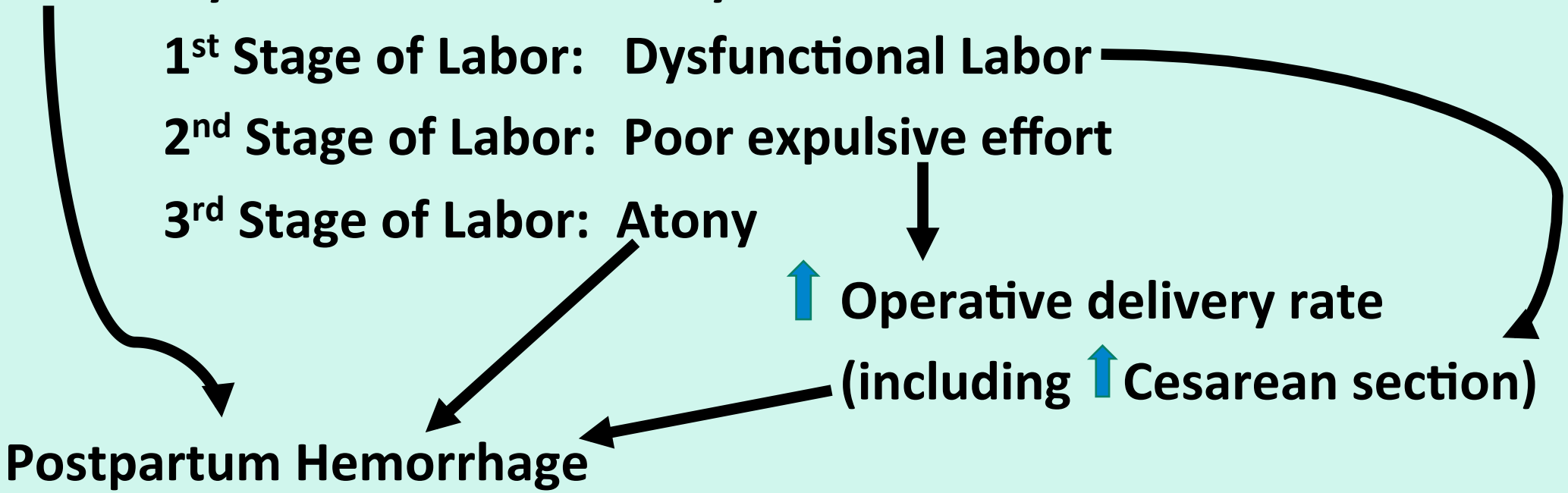
Occasional respiratory compromise/ Prolonged post-op intubation

Poor Myometrial Contractility

1st Stage of Labor: Dysfunctional Labor

2nd Stage of Labor: Poor expulsive effort

3rd Stage of Labor: Atony



Contraception in Women with DM1

- While progesterone is postulated to possibly aggravate DM1 symptoms in pregnancy, there is no literature to support avoiding progesterone in the smaller doses associated with contraceptive methods (e.g. oral contraceptives, progestin injection, and progestin-containing implants or IUDs).
- Non-hormonal IUDs can cause increased menstrual flow, which may be an undesirable side-effect in patients whose myometrial contractility may be diminished.

Contraception in Women with DM1

- No form of contraception is contraindicated in DM1, and patient response to the method chosen will vary, as in the general population.
- Individual's DM1 disease progression with increasing age may influence family planning decision-making in terms of timing (consider not delaying child-bearing to be healthy for pregnancy).
- Postpartum Tubal Ligation under epidural may be preferable to interval tubal ligation under general anesthesia.

Summary

Many women with Classic DM1 are relatively asymptomatic and are undiagnosed before conceiving a pregnancy.

Maternal DM1 can lead to obstetrical complications even if the fetus if not affected.

Congenital DM1 can *further* complicate her pregnancy, labor, delivery, and postpartum course.

Summary

Even recent cases series describe ~50% of maternal Classic DM1 only being diagnosed through an offspring affected with Congenital DM1

--During pregnancy, through the fetal presentation of polyhydramnios, decreased fetal movement, talipes, facial diplegia, and mild cerebral ventriculomegaly

--Or postpartum, by the neonatal presentation of hypotonia, respiratory insufficiency, facial diplegia, and talipes.

In light of the potentially life-threatening and avoidable obstetrical complications that may ensue, prenatal recognition of Congenital DM1 is highly important not only for the fetus, but also for the mother.

Summary

As devastating as it is, the diagnosis of Congenital DM1 in the baby can provide the key to appropriate planning and obstetrical management decisions which can be life-saving to the mother.

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Lesson of the Week

Do you shake hands with mothers of floppy babies?

T H H G KOH

Do you shake hands with mothers with polyhydramnios, decreased fetal movement and sonographic signs of fetal hypotonia?

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