Lactation and breastfeeding

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Lactation/Breastfeeding Session objectives

- **To be able to describe the**
  - **Ministry guidelines**
  - **Anatomy of the breast**
  - **Physiology of lactation**
  - **Constituents of breast milk**
  - **Advantages of breast feeding**
  - **Proper b'feeding technique**

Lactation/Breastfeeding Session objectives

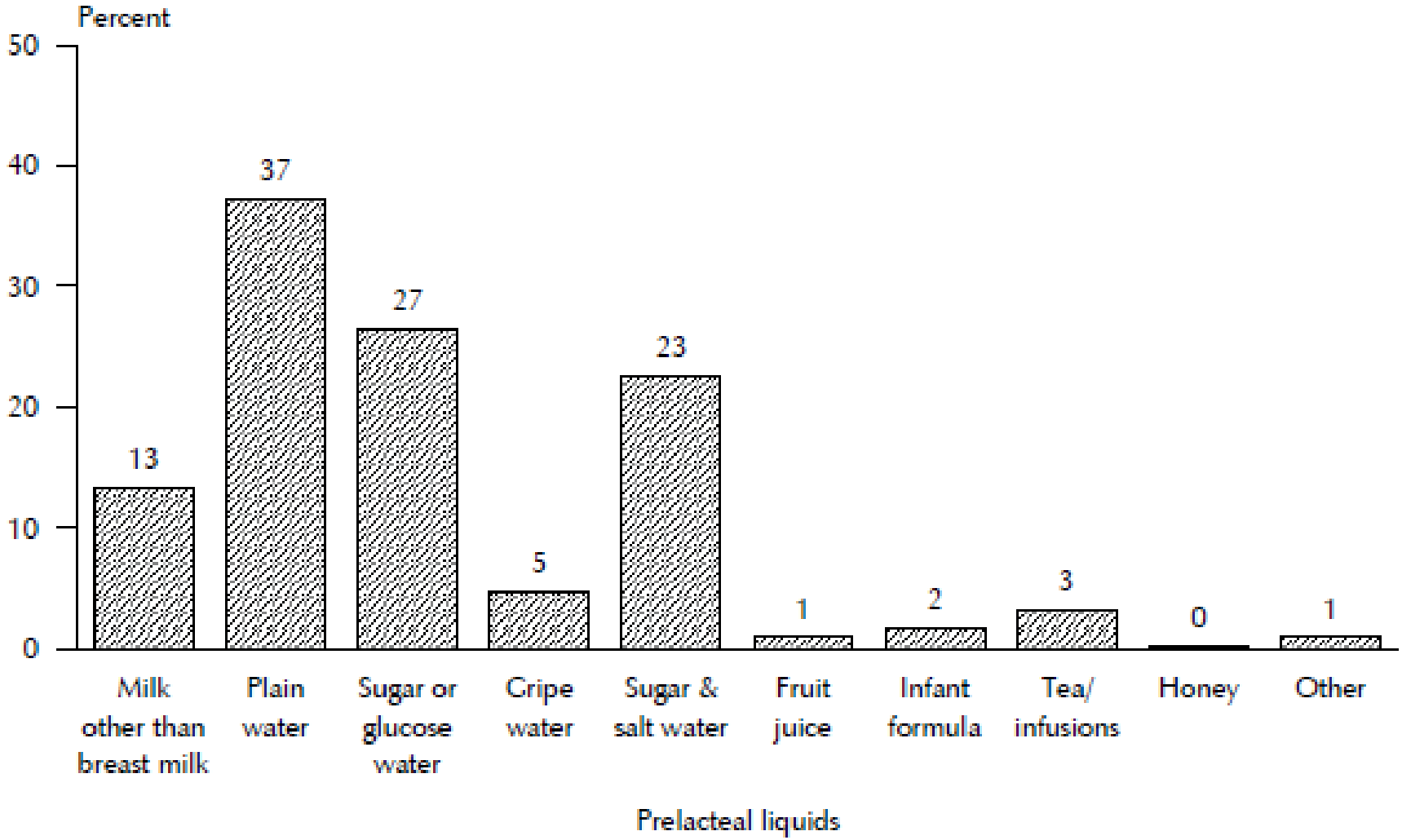
- **Complications of b’feeding and their management**
- **B’feeding in special circumstances**
- **Nutrition during the breastfeeding period**
- **Drugs contraindicated in b’feeding**
- **Contraception during the b’feeding period.**

Ministry of Health Guidelines

- Seventeen steps
- Baby Friendly Hospital Initiative

- ✓ **Infants who receive only breast milk are considered exclusively breastfed.**
- ✓ **Exclusive breastfeeding is recommended for the first 6 months of life.**

Figure 11.3 Prelacteal Liquids

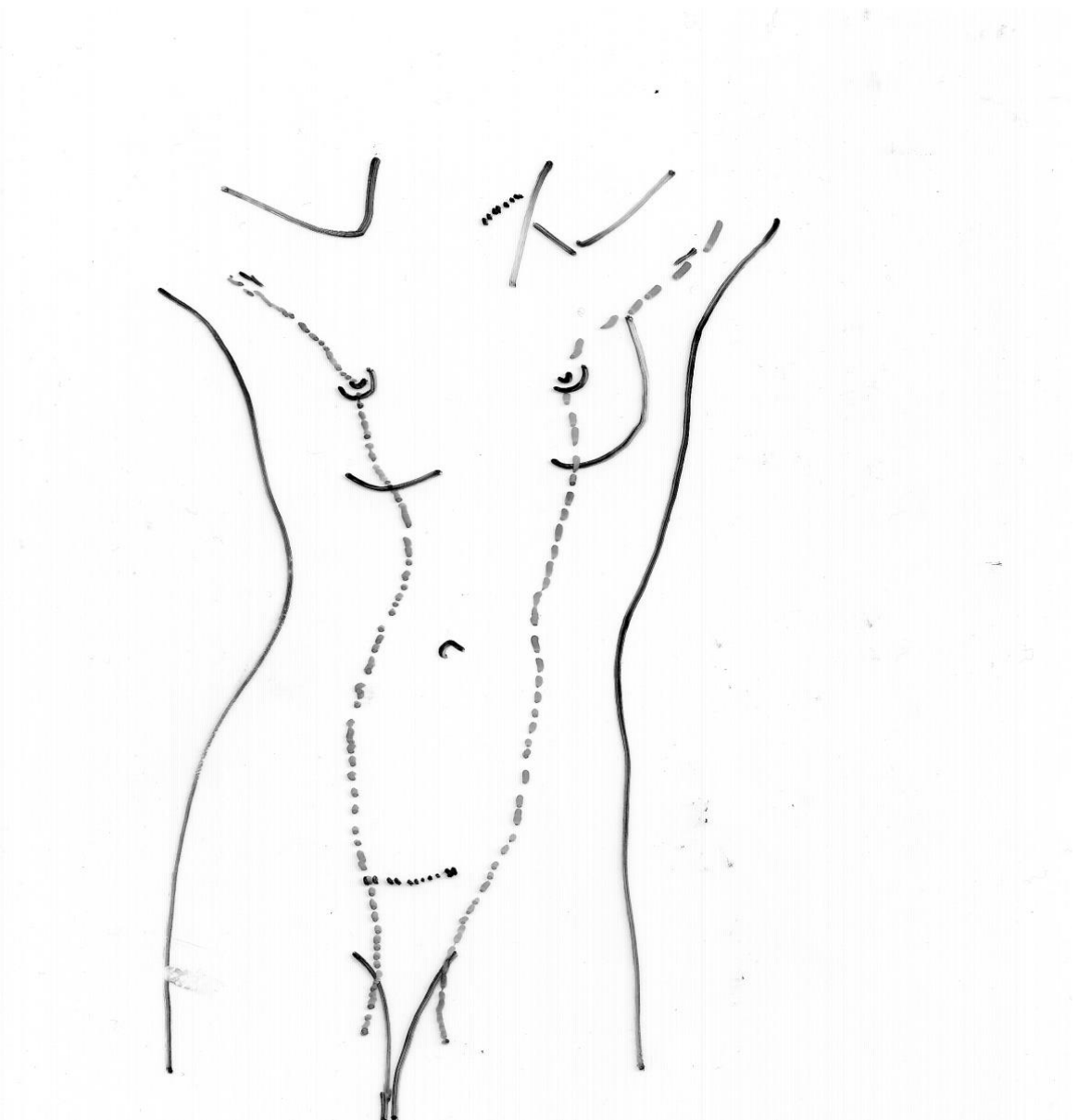


Kenya 2008-09

Embryology

Stage Mammary	Age of embryo (days)	Crown-rump length of embryo (mm)
band	35	6
streak	36	8
Line	37	10
crest	40	13
hillock	42	13
bud	49	20

Position of Mammary Ridge or Milk Line



Evolution of the nipple

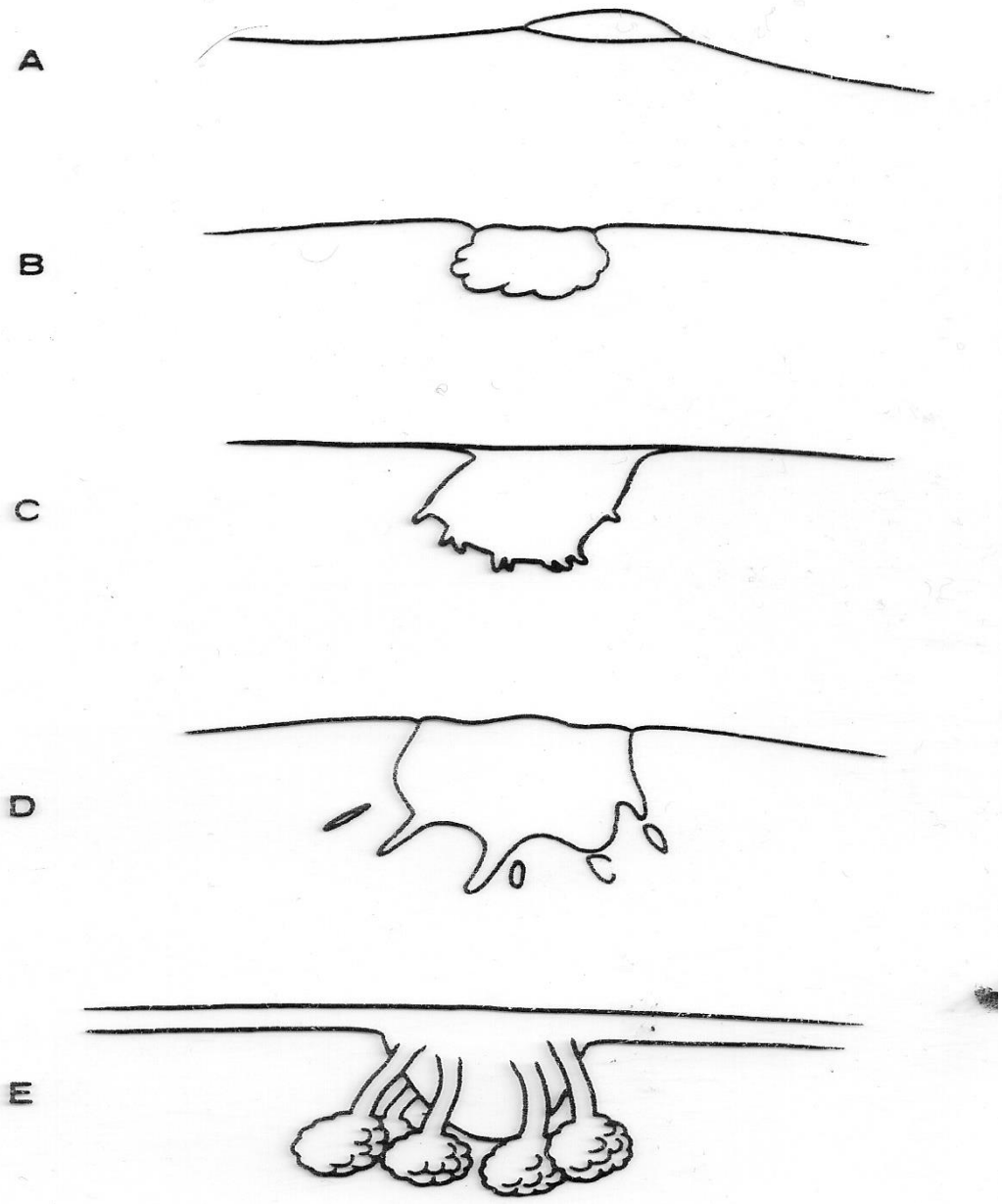
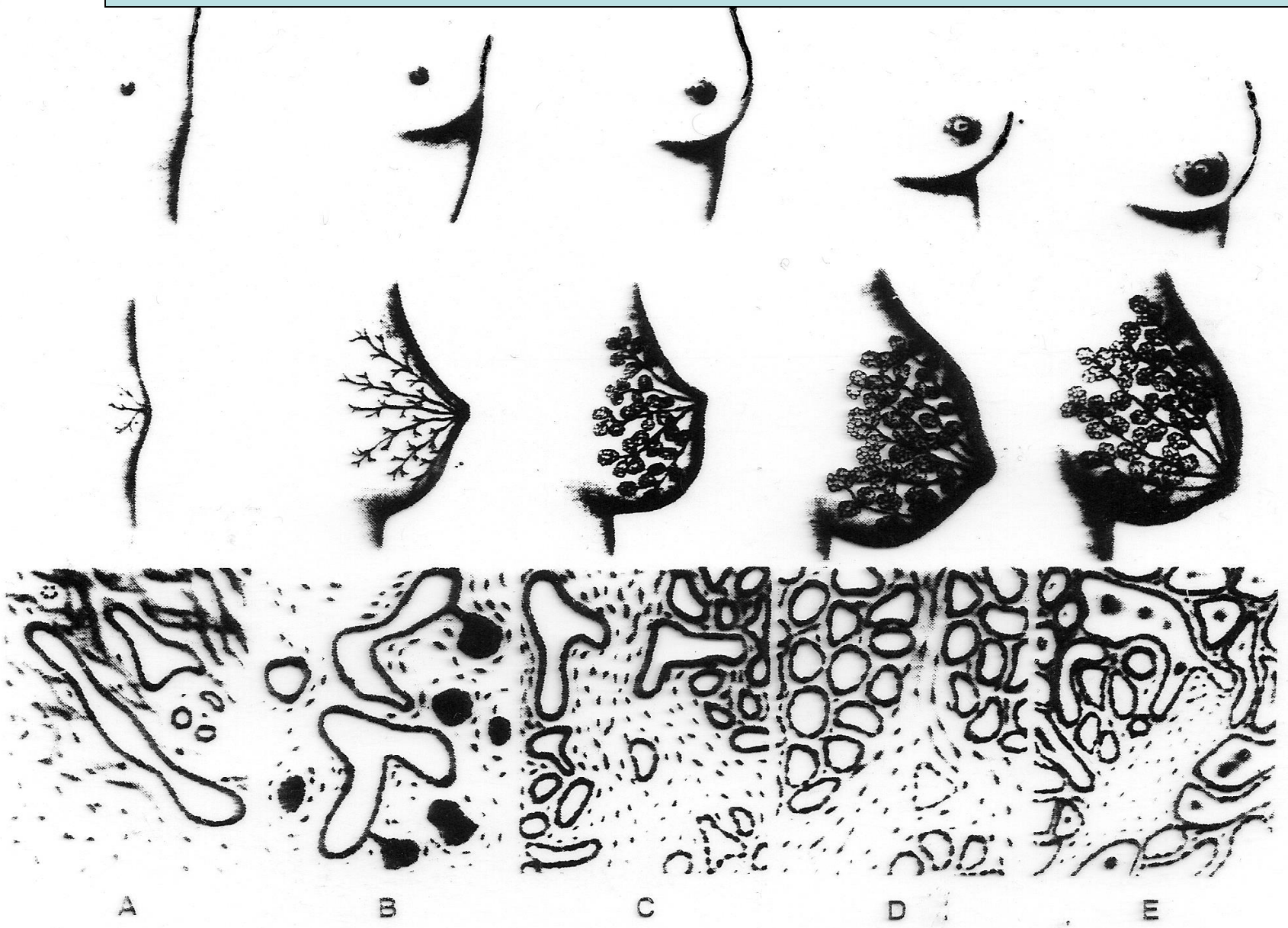
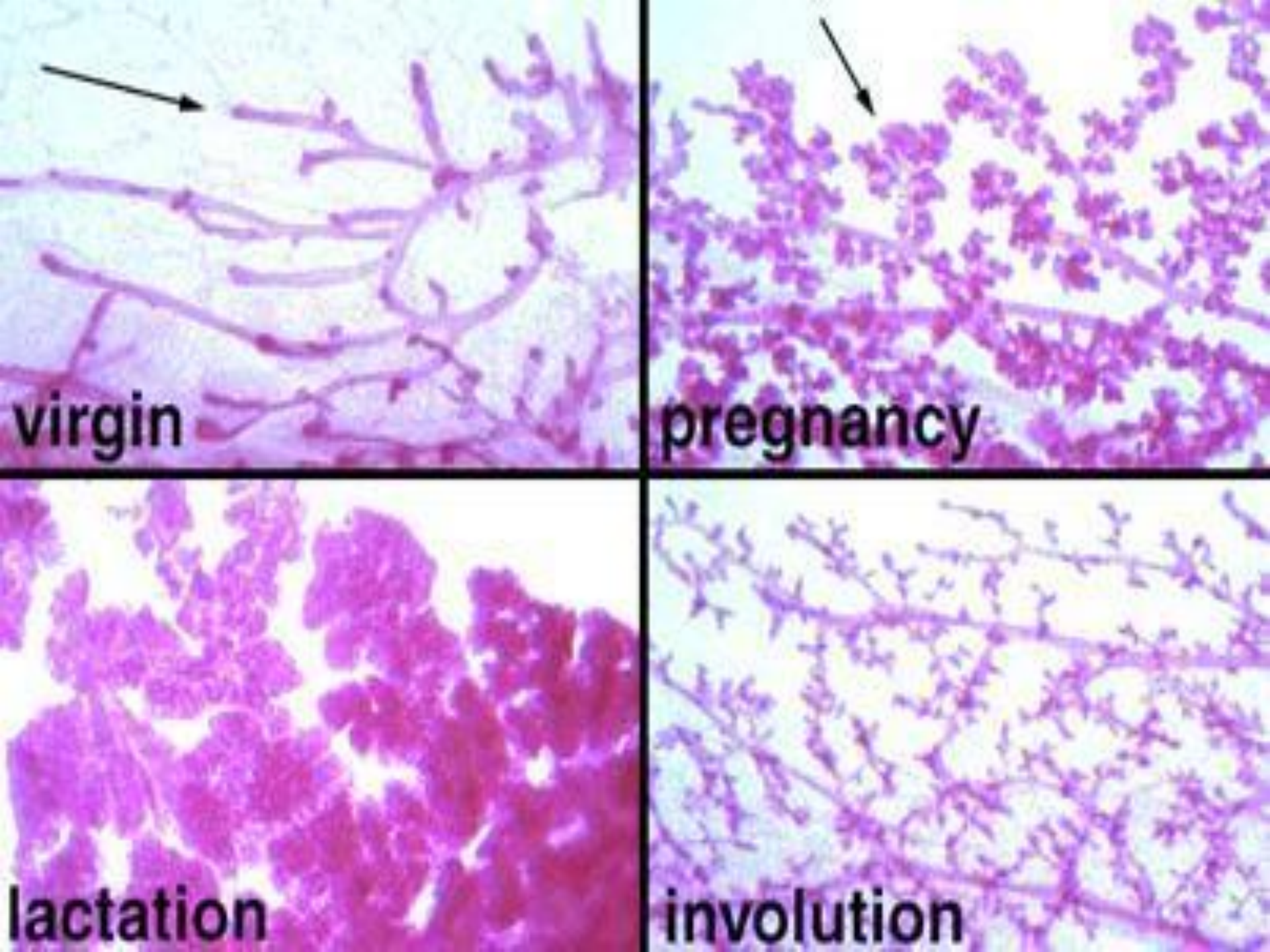


Fig. 2-1. Evolution of nipple. **A,** Thickening of epidermis with formation of primary bud. **B,** Growth of bud into mesenchyme. **C,** Formation of solid secondary buds. **D,** Formation of mammary pit and vacuolation of buds to form epithelial-lined ducts. **E,** Lactiferous ducts proliferate. Areola is formed. Nipple is inverted initially. (Modified from Weatherly-White RCA: *Plastic surgery of the female breast*, Hagerstown, Md, 1980, Harper & Row.)

Tanner stage development of the breast



STAGE 1 STAGE 2 STAGE 3 STAGE 4 STAGE 5


virgin
pregnancy
lactation
involution

MAMMARY GLAND

- PAIR – MODIFIED GLANDS
- SUPERFICIAL SURFACE CONVEX
- 2^{ND} – 6^{TH} RIB 10-12 DIAMETER
- 5-7 CMS CENTRAL THICKNESS
- UPPER OUTER QUADRANT – AXILLARY TAIL
- ARTERIES- Br's of intercostals and Internal Thoracic and Internal Mammary
- Venous drainage-Axillary, Internal Thoracic and intercostal veins

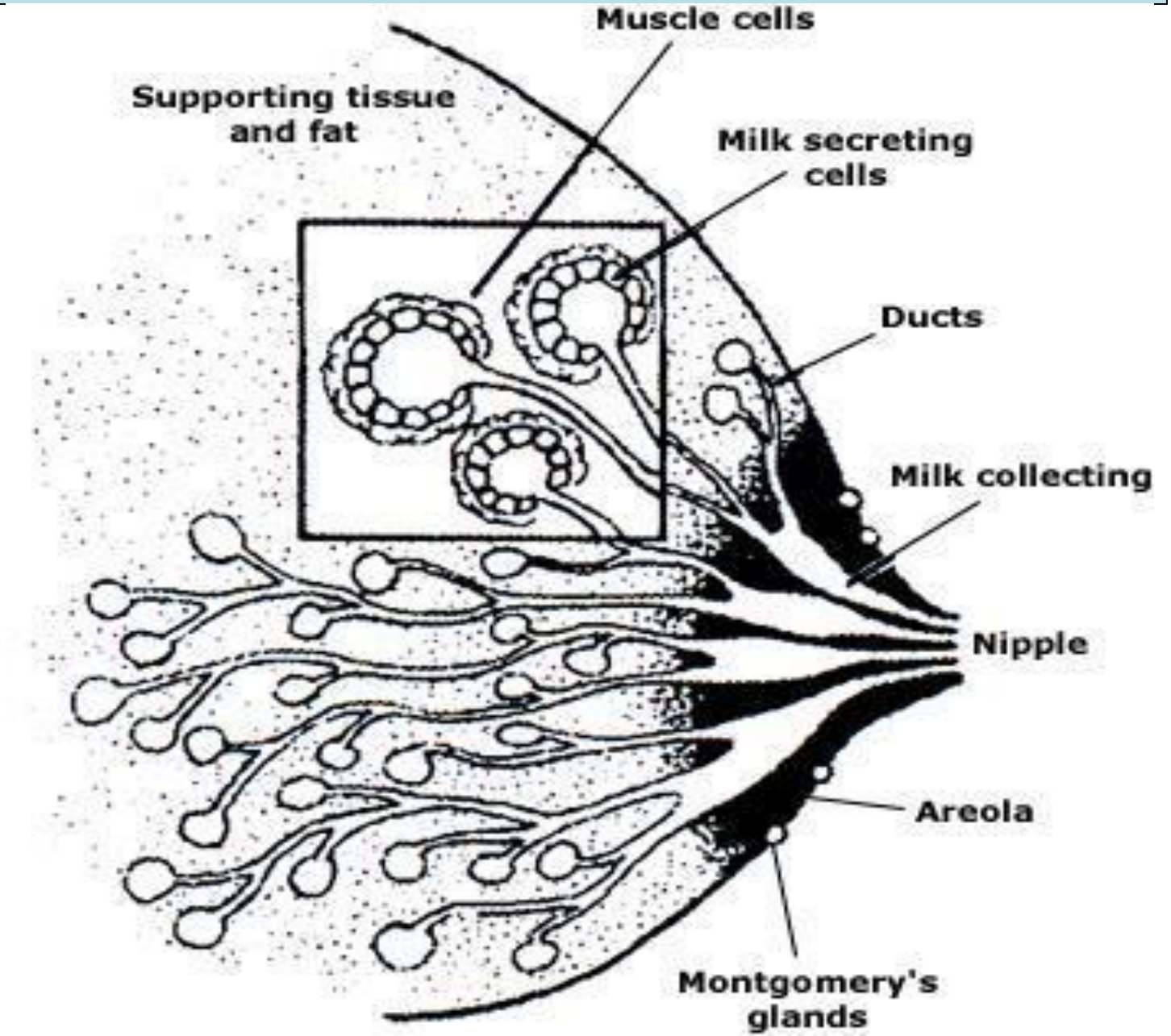
MAMMARY GLAND

- NON PREGNANT 200 GMS
- NEAR TERM 400 - 600 GMS
- LACTATION 600 – 800 GMS
- GLANDULAR TISSUE – PARENCHYMA
- CONNECTIVE TISSUE – STROMA (SUPPORTING)

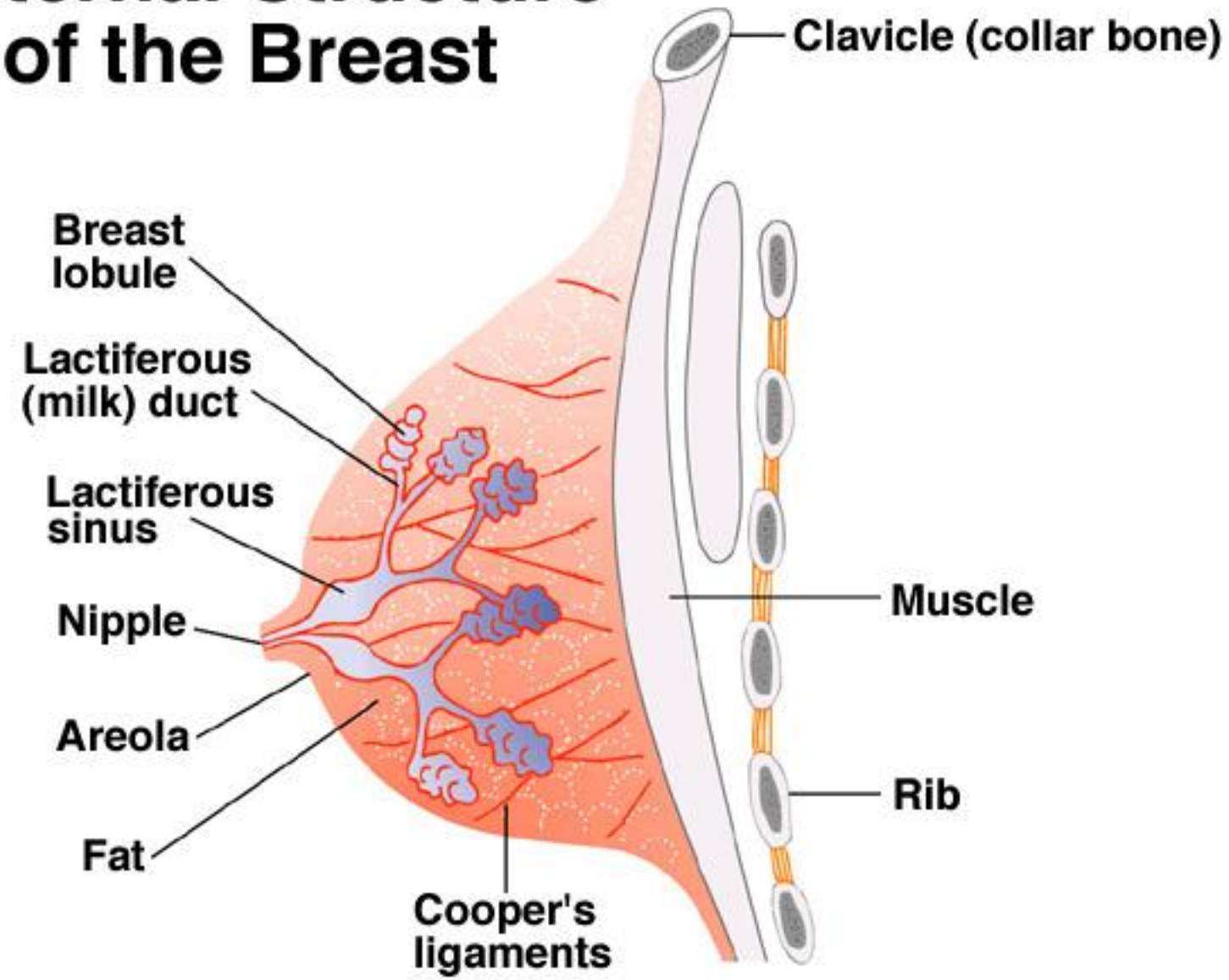
EPITHELIAL COMPONENTS LOBES 15 - 25

- LACTIFEROUS DUCTS
- LOBE SUBDIVED INTO 20-40 LOBULES WHICH INTURN ARE COMPOSED OR 20-100 ALVEOLI
- ALVEOLUS SINGLE LAYER
- SECRETORY EPITHELIUM

Anatomy of the breast



Internal Structure of the Breast



Definitions

Lactation: the secretion of milk from the mammary glands of the breast.

Breastfeeding: the feeding of an infant at the mother's breast; nursing.

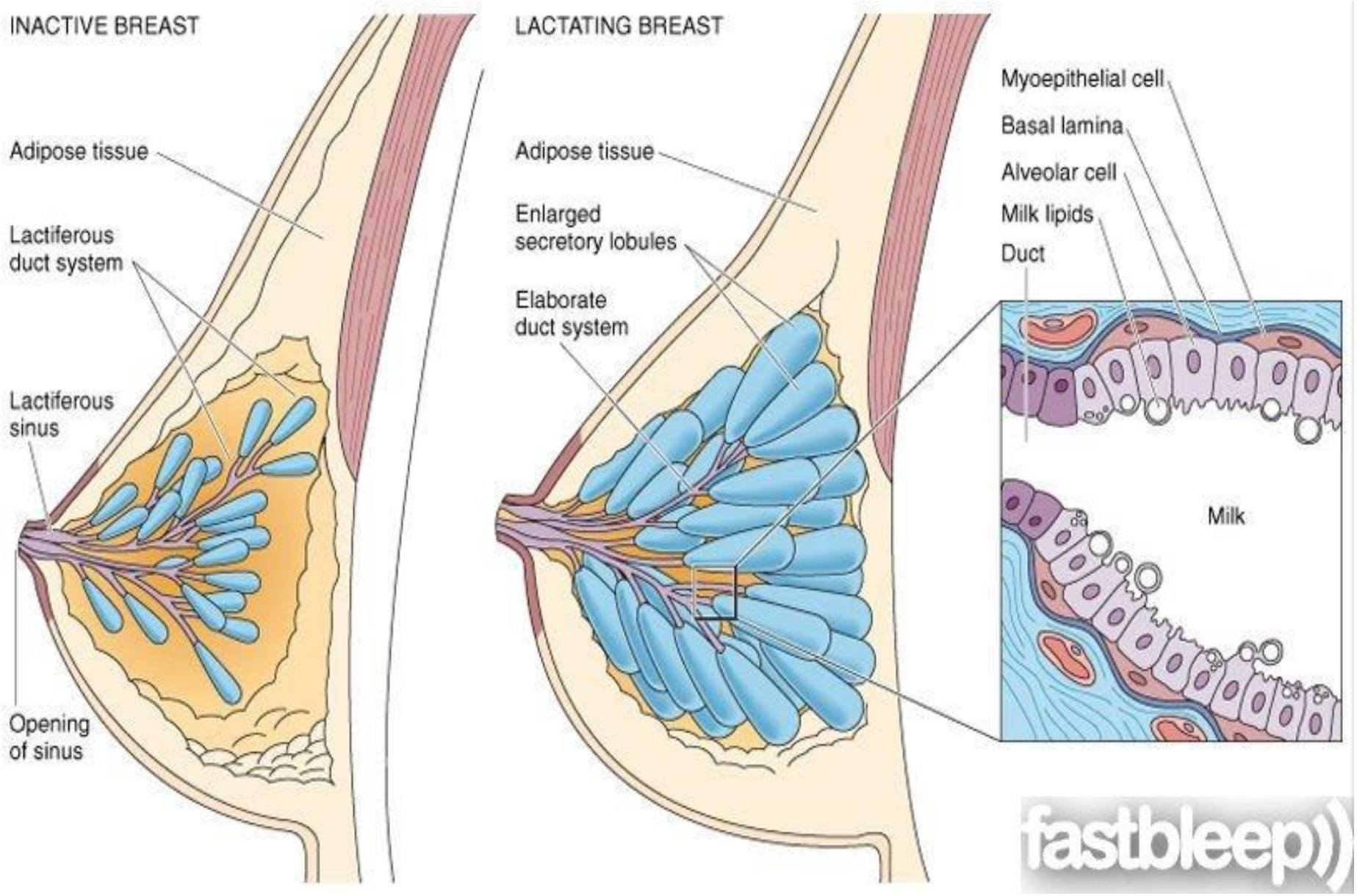
There are four stages of lactation:

1. Mammogenesis (growth of the breasts)
2. Lactogenesis (the functional change of the breasts so that they can secrete milk)
3. Galactopoiesis (maintaining the production of milk)
4. Involution (the termination of milk production).

The important hormones involved in lactation are:

- prolactin
- oestrogens
- progesterone
- adrenal corticoids (cortisol)
- insulin
- growth hormone

Mammogenesis (growth of the breasts)



- The inactive breast is mainly made up of adipose tissue; however the lactating breast has a greater proportion of glandular tissue.
- During pregnancy the breasts enlarge; the nipple pigment darkens; the skin becomes thinner and the veins in the breast become more prominent.
- In mammogenesis the ductal system grows and branches; the amount of connective tissue and supporting cells increases and fat is laid down in the breast. This is stimulated by the oestrogens, growth hormone, prolactin, insulin and the adrenal corticoids.
- Progesterone is involved in the last stages of mammogenesis after the ductal system has grown. It acts with the other hormones to develop the breast lobules and alveoli, and adapts the alveoli to have secretory properties.
-

Lactogenesis (the functional change of the breasts so that they can secrete milk)

- **Lactogenesis I:** the ability of the mammary glands to secrete milk from mid-pregnancy to late pregnancy.
  - starts from mid-pregnancy till 2 days after birth. It involves the differentiation of alveolar epithelial cells and the stimulation of milk synthesis by prolactin.
- **Lactogenesis II:** the formation of large amounts of milk after parturition.
  - starts from day 3 postpartum to day 8. It is triggered by the reduction of progesterone. The breast become full and warm and produce large amounts of milk.

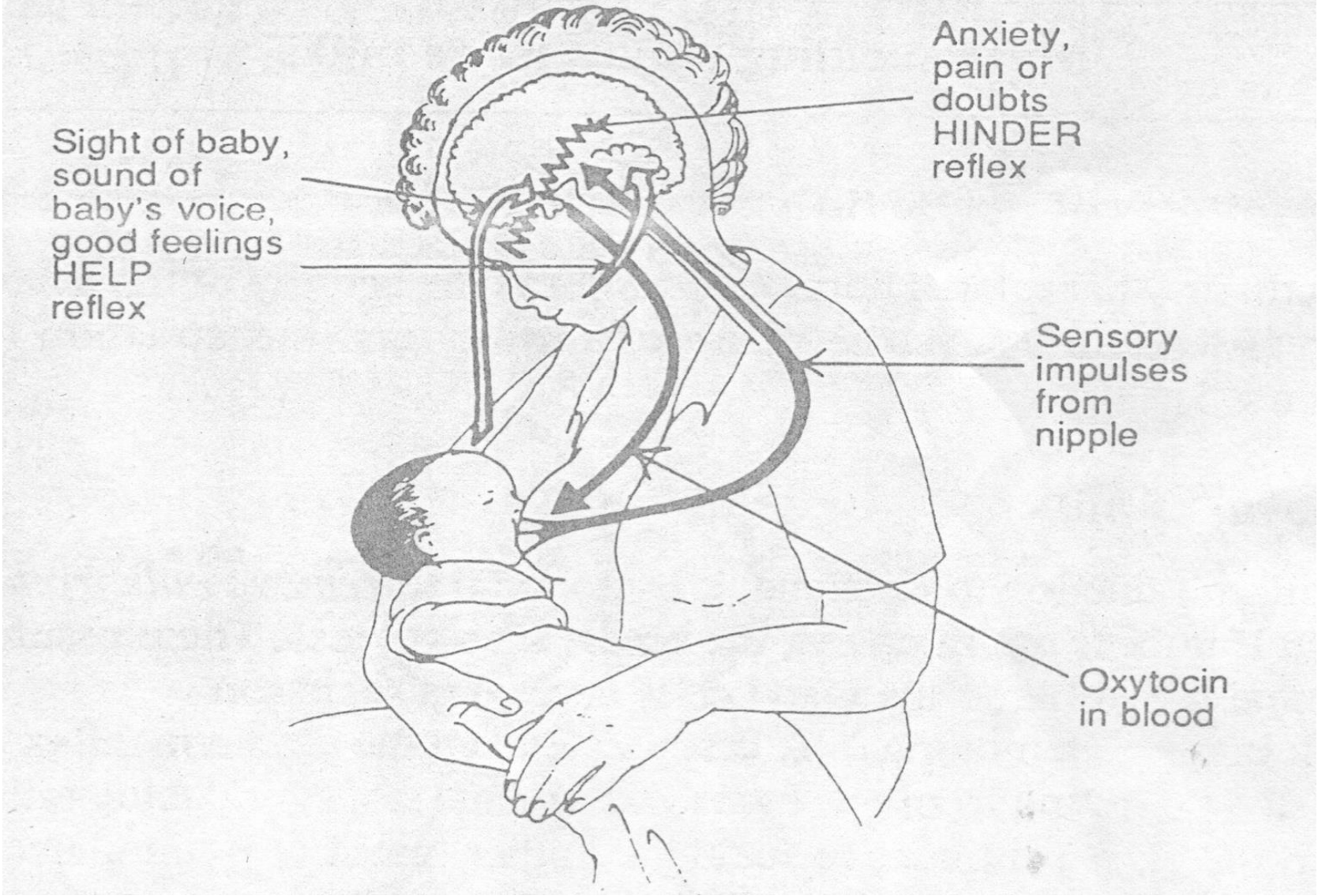
Galactopoiesis (maintaining the production of milk)

- starts around 9 days after birth and finishes at the beginning of involution. It is the maintenance of milk secretion controlled by hormones. Breast size starts to diminish between 6 to 9 months after birth. The rate of milk formation normally decreases after 7-9 months; however milk production can continue for years if the child continues to suckle.

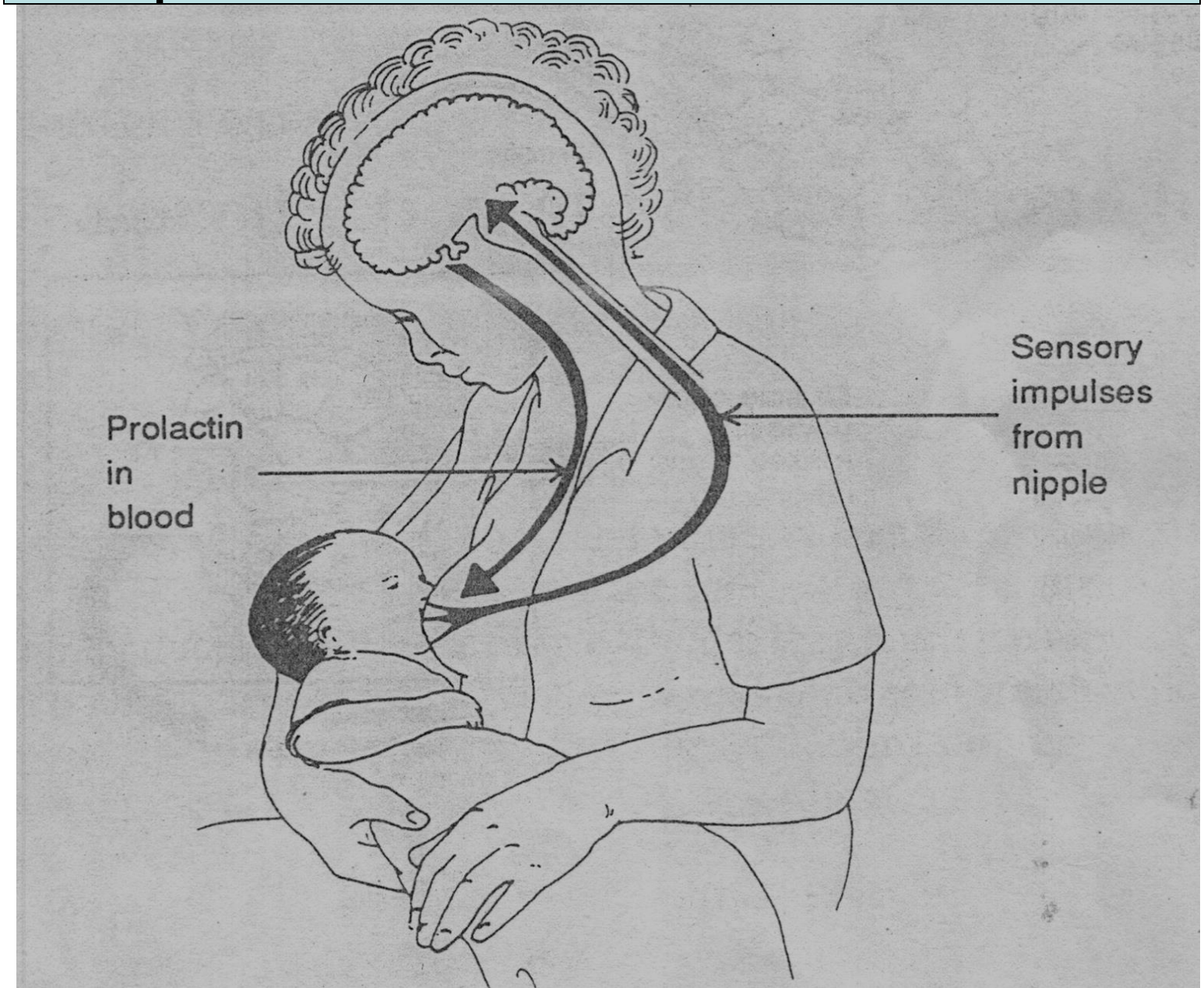
Involution (the termination of milk production).

- Involution is the loss of secretory function of milk, due to the accumulation of inhibiting peptides. It normally starts 40 days after the last breastfeed. The epithelial cells no longer require their secretory properties so they are removed by the process of apoptosis and replaced by adipocytes.

The oxytocin or milk ejection reflex



The prolactin or milk secretion reflex



COLOSTRUM

- PRE MILK SECRETION
- YELLOWISH
- 1ST 2-3 DAYS AFTER DELIVERY
- HIGHER SP.GR (1.040 – 1.06)

  & NA + CL CONTENT, LOWER CHO+O, K AND FAT CONTENT THAN MATURE MILK.
- NORMAL LAXATIVE ACTION

COLOSTRUM

- NATURAL STARTER FOOD

  - HELPS BABY PASS MECONIUM

  FORE MILK

- GREY WATERY – RICH IN PROTEINS LACTOSE, VITAMINS, MINERALS + WATER

  HIND MILK - END OF FEED

- WHITER THAN FORE MILK – CONTAINS MORE FAT
- BOTH NEEDED!

FORE MILK AND HIND MILK

The left hand sample is Foremilk, the first milk coming from a full breast. Foremilk has a higher water content and a lower fat content to satisfy thirst.

The right hand sample is Hindmilk, the last milk coming from a nearly empty breast. Hindmilk has a lower water content and a higher fat content to satisfy hunger. As breastmilk is made continuously including during the feed itself, the milk can switch between Foremilk and Hindmilk until the baby has had enough.

Factors

- **Secretory IgA and other immunolgobulins**
- **Bifidus factor**
- **Antistaphlococcal factor**
- **lysozymes**
- **lactoferrin**
- **leucocytes**
- **interferon**
- **lactoperoxidase**
- **Prostaglandins**

Anti-infective properties of breast milk

Factor	Function
Secretory IgA and other immunolgobulins	Coat intestinal mucosa and protect from bacteria and viruses: high levels in colostrum –gradually disappears
Bifidus factor	Creates inhospitable conditions for enteropathic bacteria through presence of L.Bifius and resulting acidity
Antistaphlococcal factor	Resists staphlococci, especially S. Aureus
lysozymes	Attack bacterial cell wall by cellular lysis, levels increase for 6 months after delivery
lactoferrin	Inhibits growth of bacteria by chelating iron
leucocytes	Destroy pathogens by phagocytosis, produce lysozyme, lactoferrin, IgA and interferon
interferon	Protects against viral infections
lactoperoxidase	Kills streptococci
Prostaglandins	Act as cytoprotectors, full effect still unknown

Distribution of Immunolglobulins and other soluble substances in colostrum and milk delivered to the breastfed infant during a 24 hrs period

	Concentration in mg/day weekly after delivery			
Soluble Product	<1	1-2	3-4	>4
Immunoglobulin				
I gG	50	25	25	10
I g A	5000	1000	1000	1000
Ig M	70	30	15	10
Lysozyme	50	60	60	100
Lactoferrin	1500	2000	2000	1200

Constituents of human and cow milk

	HUMAN	COW'S
ENERGY (Kcal/ml	75	66
LACTOSE (g/100ml	6.8	4.9
PROTEIN (g/100ml)	1.1	3.5
FAT (g/100ml)	4.5	3.7
SODIUM (mmo11l)	7	22
WATER(ml/100ml)	87.1	87.3

ADVANTAGES OF BREASTFEEDING

- **B-est for baby**
- **R-educes allergy**
- **E-conomical**
- **A-ntibodies**
- **S-tool inoffensive**
- **T-emp always right**
- **F-resh**
- **E-motionally bonding**
- **E-asily digested**
- **D-iarrhea reduced**
- **I-mmediately available**
- **N-utritious**
- **G-astroenteritis reduced**

Health Benefits for Breastfeeding Women

Postpartum Benefits

-Helps to expel the placenta

-Reduces blood loss

-Speeds uterine involution

-Helps body weight return to normal

Reduces Cancer Risks

-Epithelial Ovarian Cancer

-Breast Cancer

Bone Health

-Greater bone density among women who have ever breastfed

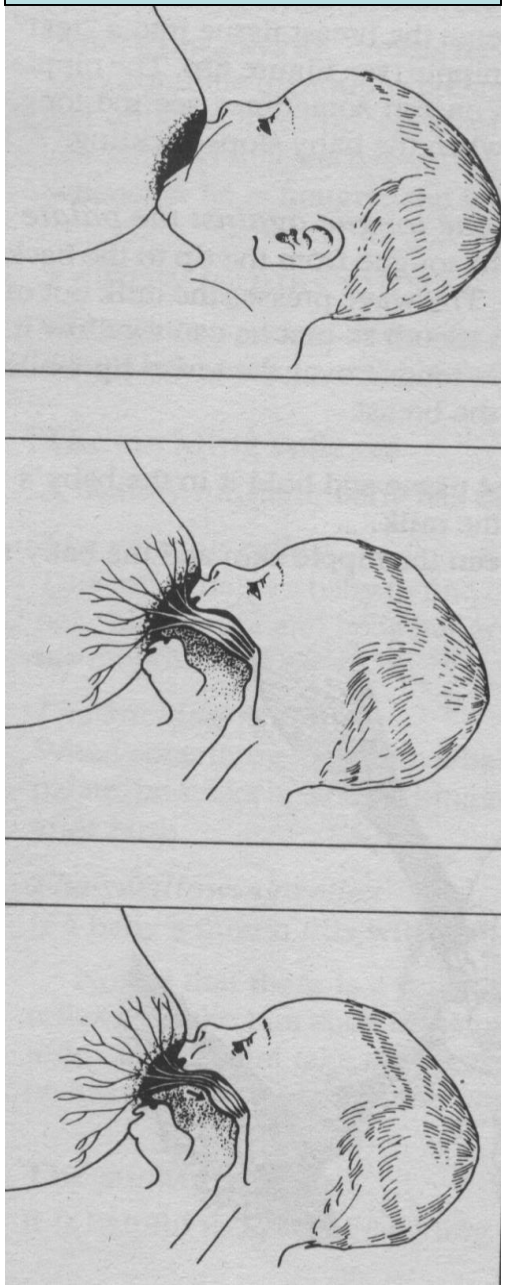
-Lower risk of hip fracture later in life

Proper breastfeeding technique

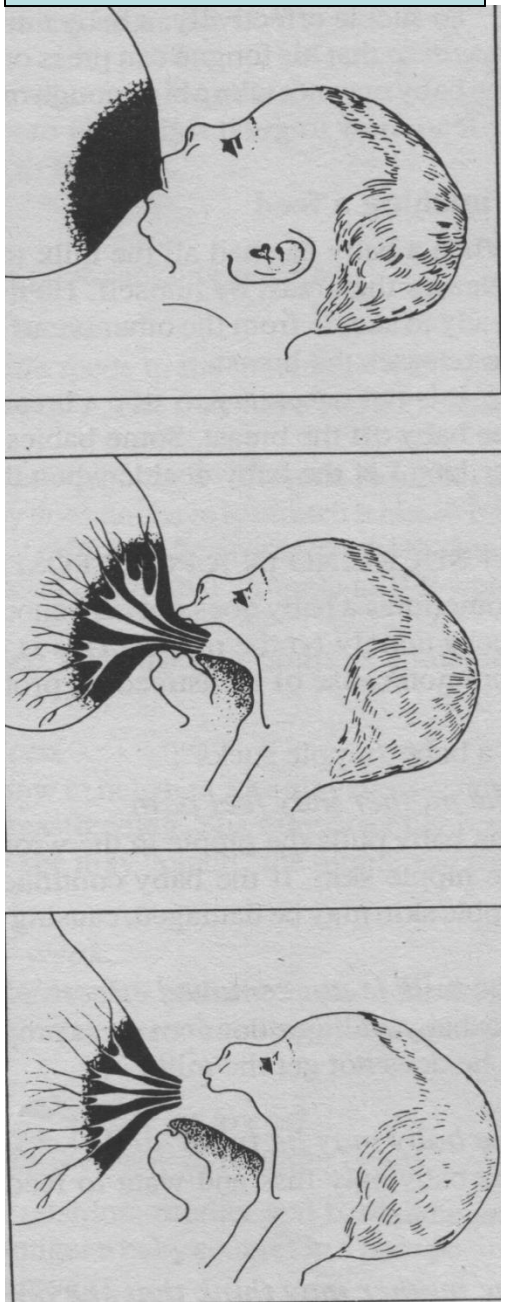
- Positions
- Entire areola in mouth

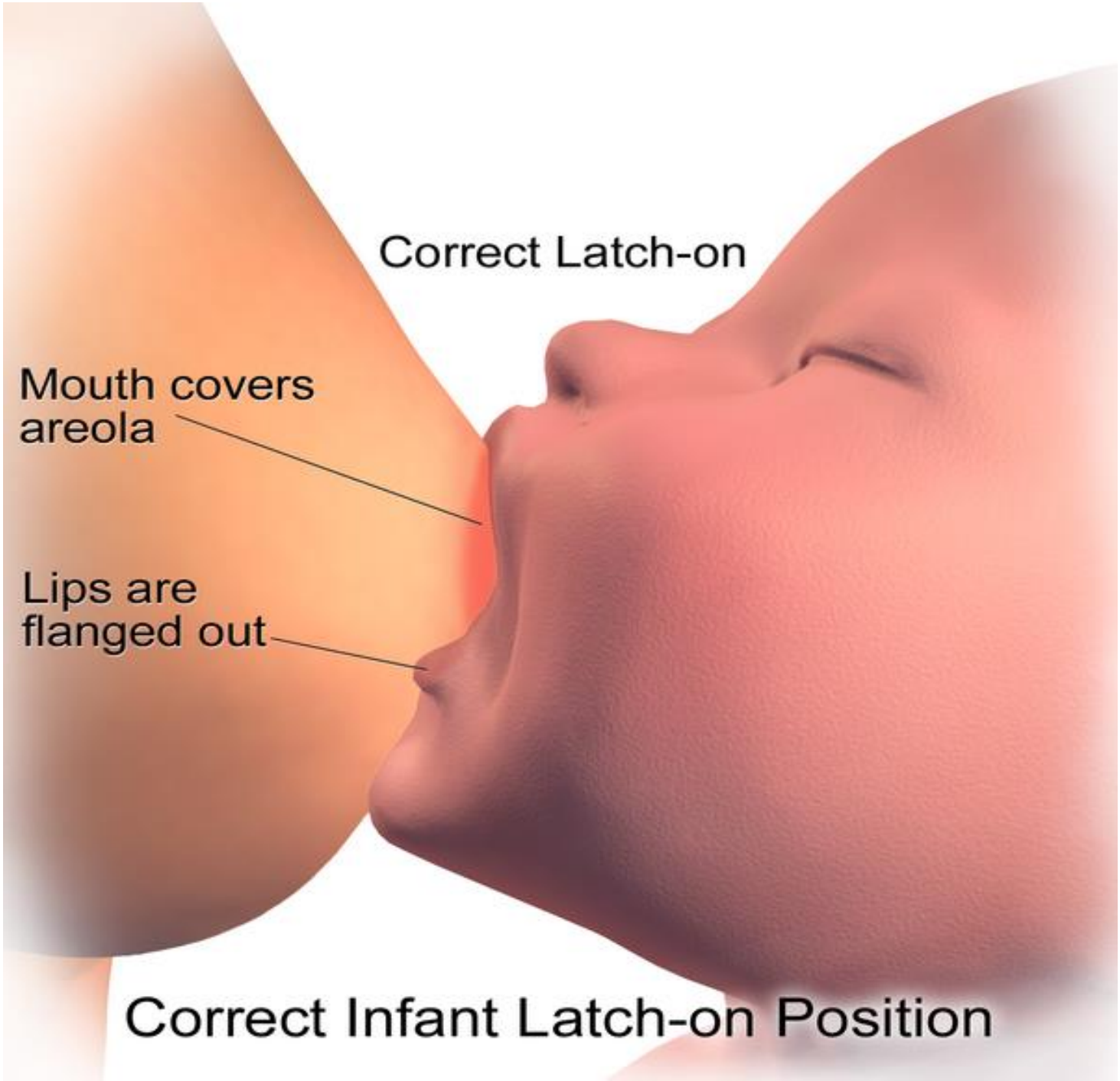
Baby suckling in a good position

CORRECT



INCORRECT




Correct Latch-on
Mouth covers areola
Lips are flanged out
Correct Infant Latch-on Position

Breastfeeding in special circumstance

- Preterm
- Sick mother/baby
- Cleft palate/lip
- Working mother
- Twins/triplets

Breastfeeding Twins

Can Employed Women Use LAM?

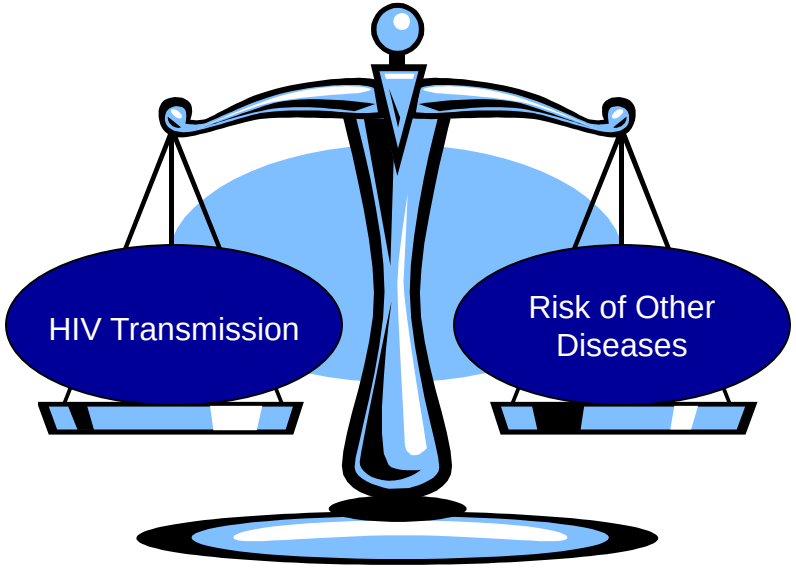
- Women who are able to keep their infants with them at the work site or nearby and are able to breastfeed frequently can rely on LAM as long as they meet the three criteria for LAM.
- Women who are separated from their infants by work or for other reasons can use LAM if the separation is less than four to five hours at a time.
- Expressing breastmilk may not signal the mother's hypothalamus to stimulate milk production as well as suckling.

Complications of b’feeding and management

- Cracked nipple
- Engorgement
- Mastitis
- Abscess
- Too much milk
- Too little milk

Balancing the Risks

A mother living with HIV faces a difficult decision—whether to breastfeed, in order to give her infant important nutrients and protection from potentially deadly diseases, or not to breastfeed, to avoid the risk of transmitting HIV through breastmilk.



What Do Experts Advise?

WHO and other UN agencies advise that HIV-positive mothers avoid breastfeeding if replacement feeding meets five essential
criteria:

- **Affordable**
- **Feasible**
- **Acceptable**
- **Sustainable**
- **Safe**

Otherwise, HIV-positive mothers should breastfeed exclusively for their infants' first months of life and stop breastfeeding if replacement feeding can meet the five criteria or when breastmilk alone is no longer adequate.

Drugs and breastfeeding

- Absolute contraindications
  - Chemotherapeutic agents
  - Lithium etc

Other Contraceptive Options for Breastfeeding Women

First Choice
Non-hormonal Methods

Diaphragm

IUDs

Male and Female Sterilization

Male and Female Condoms

Spermicides

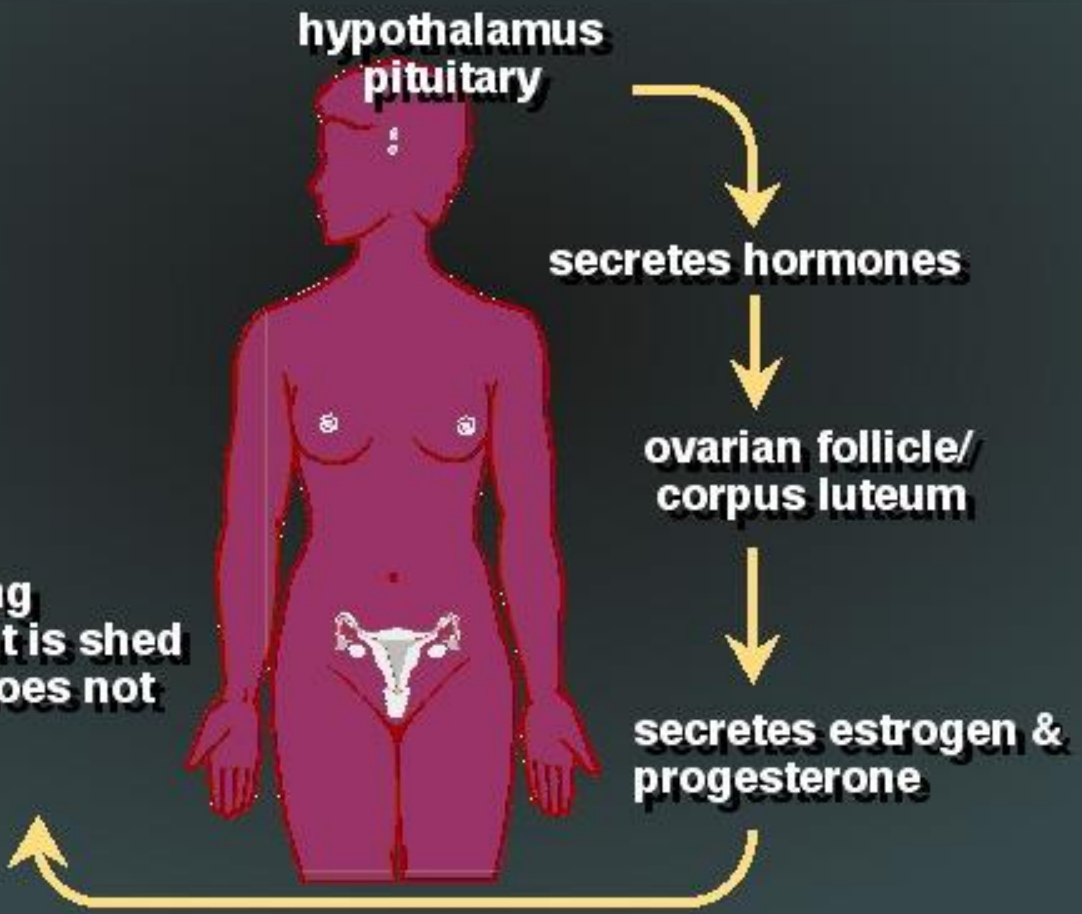
Natural Family Planning

Breastfeeding Increases Women's Contraceptive Options

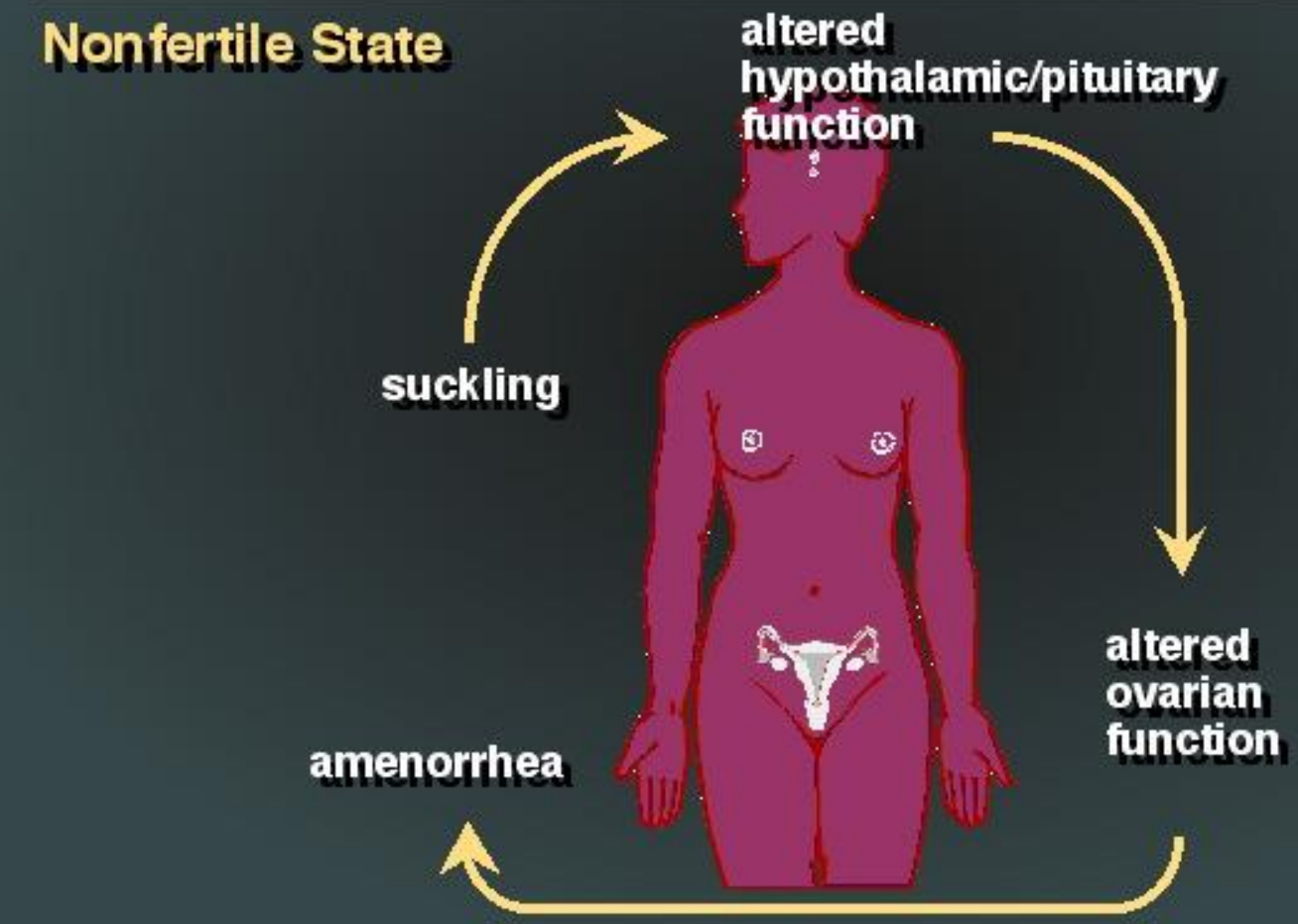
Mothers who breastfeed fully or nearly fully can rely on the lactational amenorrhea method (LAM) to delay their next pregnancy.

Normal Menstrual Cycle

Fertile State



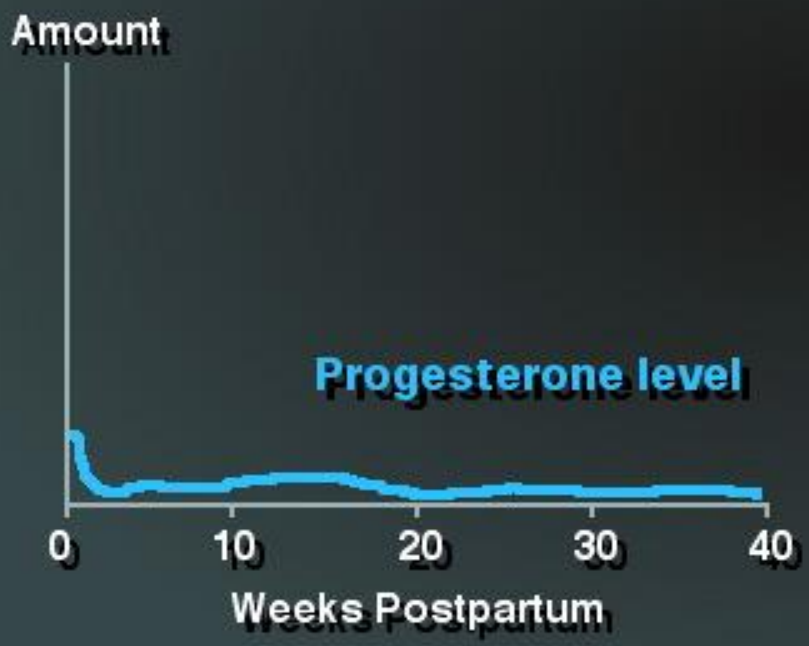
Physiology of Lactational Amenorrhea



Effects of Breastfeeding

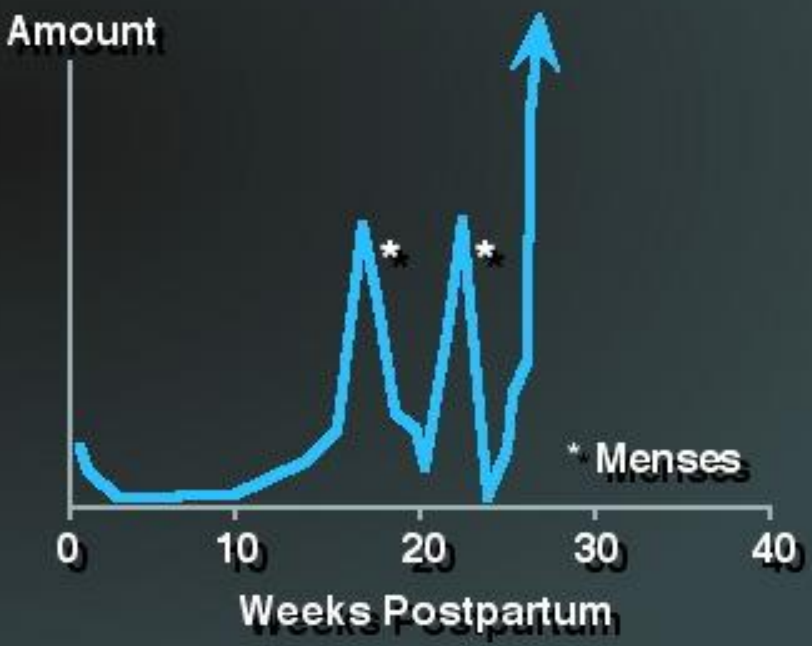
Effective Protection

Intensive Breastfeeding



Ineffective Protection

Infrequent Breastfeeding



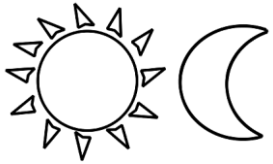
Source: Rivera, et al, 1985.

When Can a Woman Use LAM?

1

Have your menses returned?

2



Are you regularly giving the baby other food besides breastmilk, or allowing long periods without breastfeeding, either day or night?

3

Is your baby more than 6 months old?

If the answer to all these questions is **NO** she can use LAM.

If the answer to any **ONE** of these questions is **YES** her chances of pregnancy increase.

Breastfeeding Women: *Nonhormonal Methods*

All nonhormonal contraceptive methods can be used safely by breastfeeding women

- No interference with breastfeeding
- No effect on the quality or quantity of breastmilk
- No effect on infant growth and development

Breastfeeding Women: *Progestin-only Methods*

- Progestin-only methods include:
  - progestin-only pills (POPs)
  - progestin-only injectables (DMPA, NET-EN)
  - implants (Norplant)
  - levonorgestrel intrauterine system (LNg IUS)
- No effect on breastfeeding, breastmilk production or infant growth and development
- WHO recommends delay of 6 weeks because very young infants may be at risk of exposure to the progestin

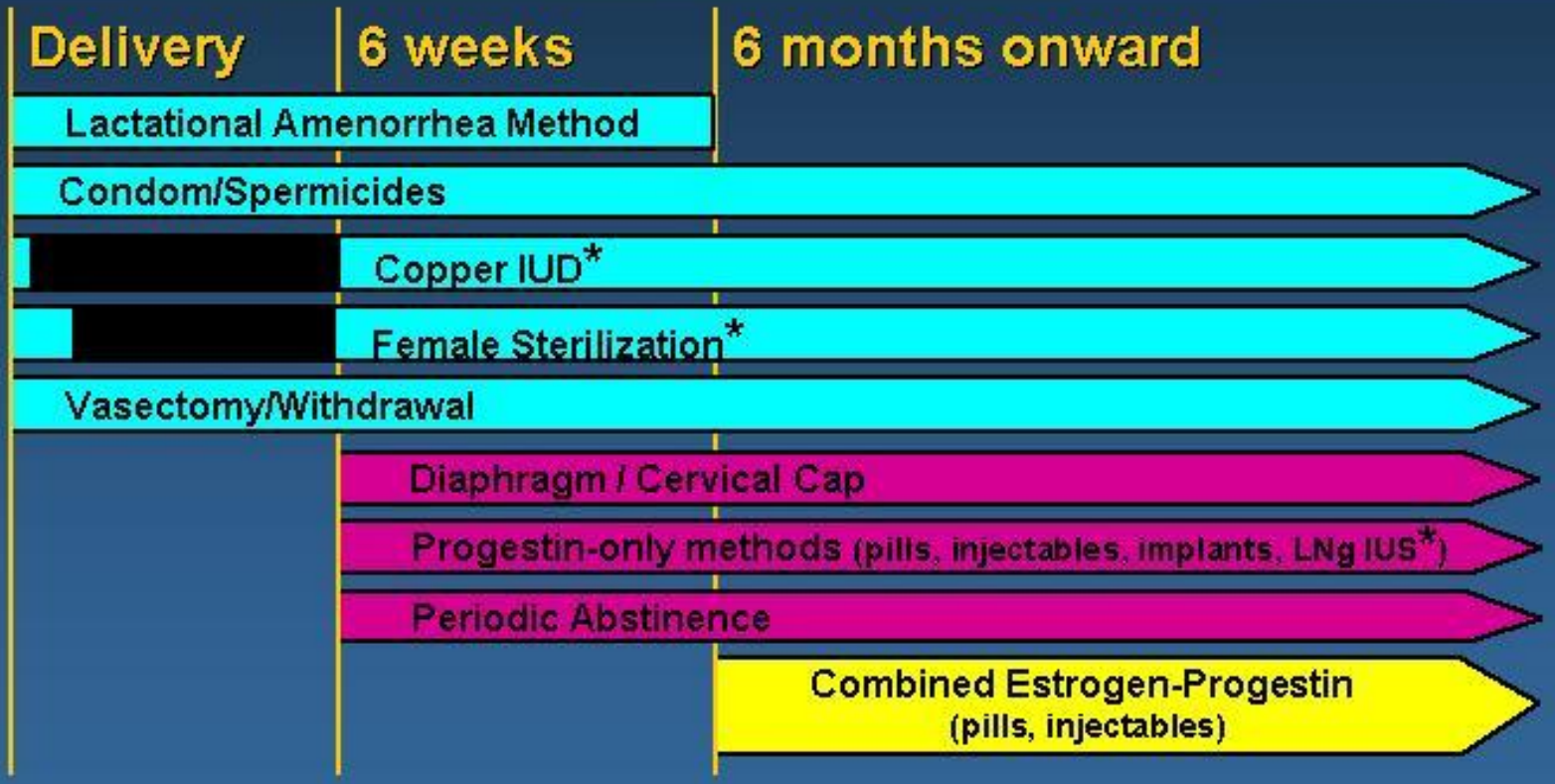
Breastfeeding women who have unprotected intercourse can safely use POPs for emergency contraception

Breastfeeding Women: *Combined Estrogen-Progestin Methods*

- Combined methods include:
  - combined oral contraceptives (COCs)
  - monthly injectables (Mesigyna, Cyclofem)
- Not to be used during first 6 weeks postpartum due to effect on establishment of lactation
- Not recommended during first 6 months postpartum due to decrease in milk production
- Can be used at 6 months postpartum, but not a preferred option

Breastfeeding women who have unprotected intercourse can safely use COCs for emergency contraception

Method Initiation for Breastfeeding Women



** can be initiated 4 - 6 weeks if uterus has returned to normal size*

Method Initiation for Nonbreastfeeding Women Postpartum

** can be initiated 4 - 6 weeks if uterus has returned to normal size*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