

Overview on Contraception

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Quality criteria of a contraception

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3 major topics should be addressed:

- ☐ Safety
- ☐ Acceptability
- ☐ Efficacy

But also

- ☐ Reversibility
- ☐ cost

Safety

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The objective is to avoid pregnancy but

- Pregnancy itself also carries risk
- All contraceptive methods are associated with side effects +/_ serious but serious side effects are **very rare**

Always keeping in mind the balance benefits/risks

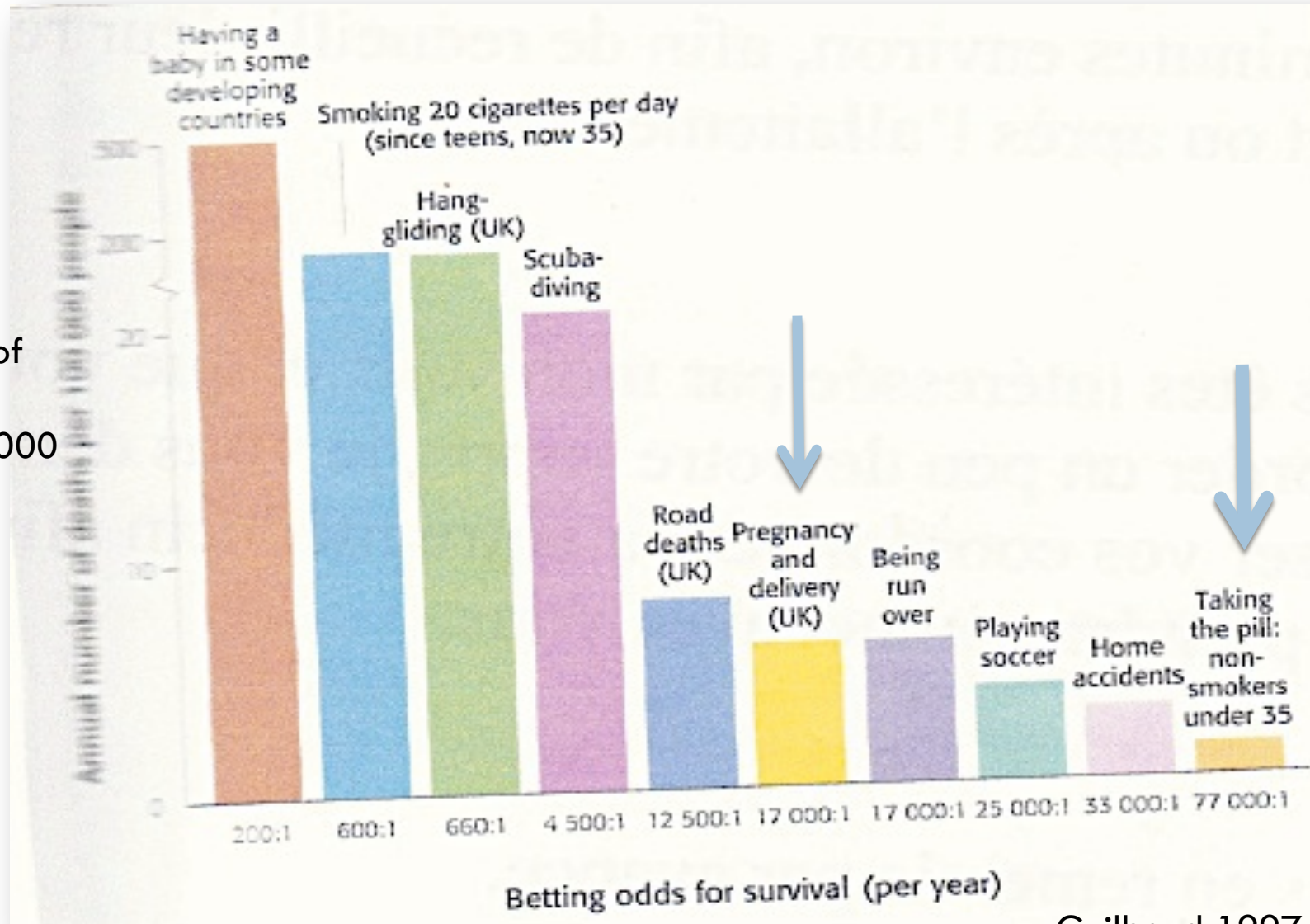
- People's concern about risks and side effects may sometimes seem irrational but it has to be taken into account because it could affect compliance;

Ex: hormones are not good for health

IUD as a foreign object

Risks associated with contraceptive pills compared to other activities

Annual
Number of
Deaths
Per 100 000
people



Effectiveness (Pearl Index or rate)

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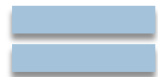
- Effectiveness calculated with Pearl index (rate)

the relative number of pregnancies



1200 ou 1300

the number of months of exposure



% of woman-years of exposure

- No method is 100% effective

Effectiveness

Perfect use/typical use

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Theoretical effectiveness \neq effectiveness in practice

□ Linked to the method itself

- Easy or not easy to use,
- long acting method

□ Linked to the user

- Age
- Sexual activity
- Duration of use

People get better at using a method with time but the cumulative probability of becoming pregnant increases with time

Ex: a method with a risk of pregnancy of 3% the first year will have a 26% risk 10 years later (Trussel contraception 2004)

Table 1. Percentage of women experiencing an unintended pregnancy during the first year of typical use and the first year of perfect use of contraception and the percentage continuing use at the end of the first year: United States of America

Method (1)	% of women experiencing an unintended pregnancy within the first year of use		% of women continuing use at one year³ (4)
	Typical use¹ (2)	Perfect use² (3)	
No method ⁴	85	85	
Spermicides ⁵	29	18	42
Withdrawal	27	4	43
Fertility awareness-based methods	25		51
Standard days method ⁶		5	
Two day method ⁶		4	
Ovulation method ⁶		3	
Sponge			
Parous women	32	20	46
Nulliparous women	16	9	57
Diaphragm ⁷	16	6	57
Condom ⁸			
Female (Reality)	21	5	49
Male	15	2	53
Combined pill and progestogen-only pill	8	0.3	68
Evra patch	8	0.3	68
NuvaRing	8	0.3	68
Depo-Provera	3	0.3	56
Combined injectable (Lunelle) ⁹	3	0.05	56
IUD			
ParaGard (copper T)	0.8	0.6	78
Mirena (LNG-IUS)	0.2	0.2	80
Implanon	0.05	0.05	84
Female sterilization	0.5	0.5	100
Male sterilization	0.15	0.10	100

Emergency contraceptive pills: treatment initiated within 72 hours after unprotected intercourse reduces the risk of pregnancy by at least 75%.¹⁰

Lactational amenorrhea method: LAM is a highly effective, temporary method of contraception.¹¹



Tableau 1. Efficacité contraceptive et taux d'abandon de la méthode après un an au Etats-Unis et en France, adapté de l'OMS

Méthode	Taux de grossesse (%) au cours de la première année d'utilisation			Taux d'abandon (%) de la méthode après 1 an d'utilisation	
	Utilisation correcte et régulière (Trussell)	Utilisation courante		Etats-Unis (Trussell)	France (Moreau)
		Etats-Unis (Trussell)	France (Moreau)		
Aucune méthode	85	85			
Cape cervicale	26, 9*	32, 16†			
Spermicides	18	29	22‡	58	62‡
Méthode de connaissance de l'ovulation (méthode naturelle)	0,4 – 5§	25	8	49	48
Retrait	4	22	10	57	45
Eponge	20, 9**	24, 12††	22‡	64	62‡
Préservatif féminin	5	21		51	
Préservatif masculin	2	15	3,3	47	53
Diaphragme	6‡‡	12‡‡			
Pilule combinée et pilule progestative seule	0,3	9	2,4	32	30
Patch	0,3	9		32	
Anneau	0,3	9		32	
Injectable progestatif (Depoprovera)	0,3	6		44	
DIU au cuivre	0,6	0,8	1,1§§	22	15§§
DIU au lévonorgestrel	0,2	0,2	1,1§§	20	15§§
Implant	0,05	0,05		16	
Stérilisation féminine	0,5	0,5		0	
Vasectomie	0,1	0,15		0	

Les taux publiés par l'OMS proviennent largement des Etats-Unis (Trussell 2011). Les taux pour la France sont issus de l'étude Cocon (Moreau 2007, Moreau 2008)

En fonction du taux de grossesse au cours de la 1^{ère} année d'utilisation, la méthode est considérée par l'OMS comme : < 1 : très efficace ; 1 – 9 : efficace ; 10 – 25 : modérément efficace ; 26 – 32 : moins efficace

* femmes uni/multipares : 26 ; femmes nullipares : 9

† femmes uni/multipares : 32 ; femmes nullipares : 16

‡ spermicide ou éponge

§ méthode sympto-thermique : 0,4 ; méthode de l'ovulation : 3 ; méthode des 2 jours : 4 ; méthode des jours fixes : 5.

** femmes uni/multipares : 20 ; femmes nullipares : 9

†† femmes uni/multipares : 24 ; femmes nullipares : 12

‡‡ diaphragme avec spermicide

§§ tout type de DIU (cuivre et lévonorgestrel)

Acceptability

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- Linked to efficacy and safety
- Lot of factors determine whether an individual person finds a particular method acceptable or not

Ex: having or not menstruation

spotting with implant

Hormonal Contraception

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- Association of estrogen + progestogen
 - Combined oral contraceptive (COC)
 - Patch
 - Ring
- Progestogen-only methods
 - Progestogen-only pill (POP)
 - implant
 - injectable
 - (hormonal IUD)

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Combined methods (pills, ring, patch)

Mechanism of action of combined method

3 bolts

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- **Inhibiting ovulation,**

Estrogen stops the development of ovarian follicle

Progestogen inhibits the LH peak very strongly (+++)

- **Endometrial atrophy,**

Progestin action on endometrium (inhospitable for Implantation)

- **Change in the cervical mucus**

Progestin thickens the cervical mucus hindering sperm motility

Clinical innovations

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- Decrease dose of ethinyl estradiol (EE)
- New estrogen (estradiol valerate)
- New Progestin used in COC
- New routes (patch, ring)
- New regimen of administration

Decrease in ethinyl estradiol (EE) dose

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Cardiovascular risks are mainly due to estrogen

Since end of sixties, decrease of the dose d'EE (~~100, 50~~, 40, 35, 30, 20 et 15 μ g)

Switching from 50 to 30

- divided by 2 the arterial risk (MI)
- decrease the diabetes mellitus risk

But has not modified

- negative action on lipids profiles
- completely suppressed the negative action on hemostasis profiles

Whatever the dose of EE, contraindications are the same and have to be respected +++

New estrogen (estradiol valerate)

Agren: The European Journal of Contraception and Reproductive Health Care, December 2011

Nomagestol/17 β estradiol (zoely®) (Qlaira®)	LNG/EE (microgynon 30 ®)
<ul style="list-style-type: none">- Less negative action on coagulation factors- No changes in lipids profile- Negligible change of glucose tolerance- Slight increase of CRP- More important Increase of SHBG	<ul style="list-style-type: none">- Negative changes in coagulation factors- Slight Increase of HDL and triglycerides and decrease of LDL- Decrease of glucose tolerance- Increase of CRP- light Increase of SHBG

Theoretical decrease of the cardiovascular risk but no studies done with women at risk and tolerance is not very good (irregular bleeding)

CONTRE-INDICATIONS are same as for EE and have to be respected +++

Evolution of the Progestin used in COC

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- All the progestin used in combined pill derives from nor testosterone
- All blocks the ovulation and has a +/- androgenic potential

1st generation	Norethindrone (injectable)
2nd generation	norgestrel, levonorgestrel Microgynon®
3 rd generation	désogestrel, Gestodène Logest® norgestimate, Evra patch® etonorgestrel, Implanon® nexplanon® ring
4th generation	Drospirone yasmeen®, Yaz®
	Cyproterone acetate, Diane®

Are new generation COC better than the “old” generation?

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- Better because decrease of the estrogen and progestin dose and so decrease of CV accidents
- Benefit of most recent generations progestin ?
 - Same efficacy even if there is a better action on ovulation and on endometrium
 - Less impact on lipids and glucose profiles
 - Less androgenic action (weight, acne ????)
 - Less anti mineralocorticoid effect for drospirone (weight?????)

BUT the most recent generations progestin seem to increase slightly the thromboembolic risk,

AND the tolerance(side effects) does not seem to be significantly better;

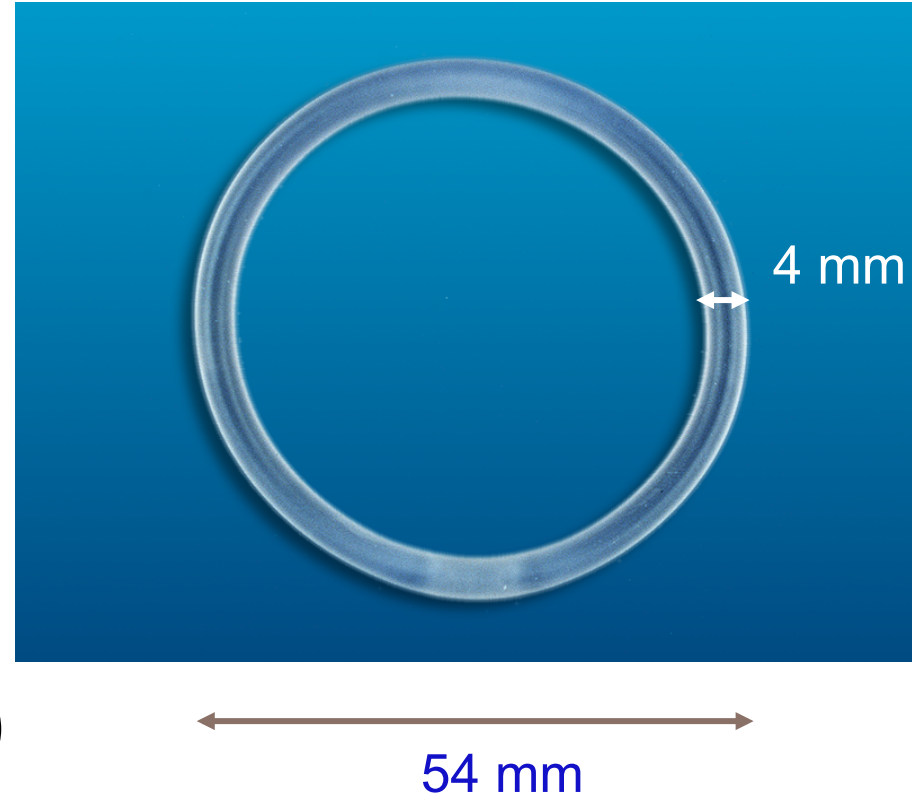
New routes of combined hormonal contraception (patch, ring)

NUVA Ring® (Avril 2004)

Ring of polymeric contains a combination of estrogen (EE: 15mcg) and 3rd generation progestin (etonorgestrel 150/24H)

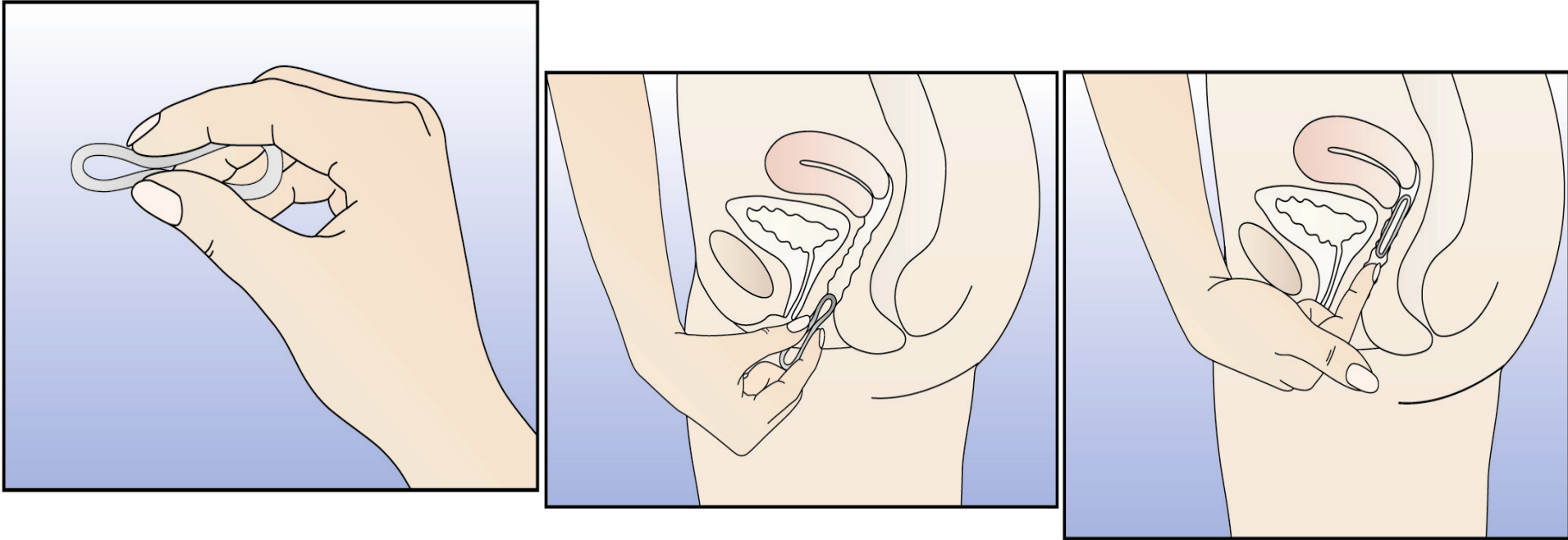
Well absorbed through the Vaginal mucosa (no hepatic passage)

□ Pearl Index : 0,6 per 100 woman-years



Nuva Ring insertion

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Ring use

Ring-free week

Ring use

Next cycle

1

21

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New routes of combined hormonal contraception (patch, ring)

Evra patch® (Avril 2004)

Patch contains a combination of estrogen (EE: 20 mcg) and 3rd generation progestin (norelgestromine (norgestimate) (150/24H)

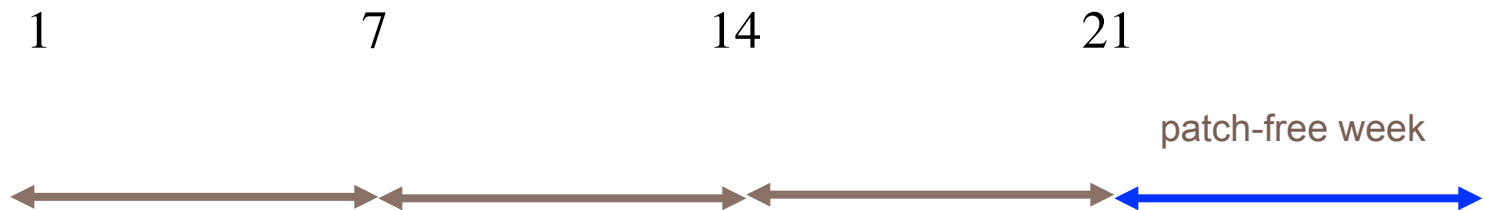
Transdermal absorption

□ Pearl Index : 0,8 per 100 woman-years



A new patch is put on each week, for 3 weeks

Interval free patch: one week



Regimens for combined pills

□ *Type of preparations*

- Monophasic : same dose of hormone in every pill of the packet
- Biphasic or triphasic : amount of both estrogen and progestin change once or twice during the 21 days

No evidence of better cycle control and confusing for women with bi/triphasic

Monophasic : easy to manage missing pills and continuous taking

□ *How to take it?*

- Starting the 1st, 2nd or 3rd day of menstruation
- “Quick start”

Anytime in the cycle but urge to use back up contraception the 7 first day of the pack

Regimens for COC/Ring/patch

How to improve the compliance (to avoid missing pill)

- Pack with placebo (7) avoids to forget to take a new pack
 - Continuous use of combined contraceptive (Pill, ring, patch)
 - Take one pill (monophasic) every day as long as wish
- If irregular bleeding occurs, stop 7 days and start again

Benefits	disadvantages
No bleeding Less dysmenorrhea No risk of pregnancy even if missing pills	Irregular bleeding More supplies

What type of COC should be prescribed on first line (if no contraindication and regardless of age) ?

- ❑ Lower dose of estrogen (less than 35/40 μ g)
 - ❑ Second generation progestin
 - ❑ Monophasic (easy to use)
 - ❑ Continuous with or without placebo (want or does not want menstruation)
 - ❑ The cheapest one
- the more expensive is not always the best one;

Then to adapt according to side effects and acceptability

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Progestin-only method (pill, implant, injectable)

Mechanism of action of progestin-only methods

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- Thickening cervical mucus hindering sperm motility
- Causes the endometrium inhospitable to implantation
- Inhibits ovulation variably, depending on type and dose of progestogen

Progestin only-pill

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□ Progestin used

- Levonorgestrel (microval®)
- Lynestrenol (exluton®)
- Desogestrel (Cerazette®)

□ Effectiveness

1- 3 per 100 women over the first year

0,4 per 100 women with desogestrel (inhibit ovulation)

Progestin only-pill

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- More common side effects:

- Irregular bleeding
- amenorrhea

No increase risk of thrombosis even with the 3rd generation progestin

- How to take it?

- One pill every day,
- no free interval between packs
- Missing pill : more than 3 hours for exluton
- more than 12 hours for desogestrel

Macro dosed progestin- only pill

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□ Progestin used

- Lynestrenol (orgametril®)
- Chlormadinone (luteran®)
- Promesgestone (surgestone®)
- Nomegestrol (lutenyl®)
- Medrogestone (colprone®)

□ Effectiveness (inhibit ovulation)

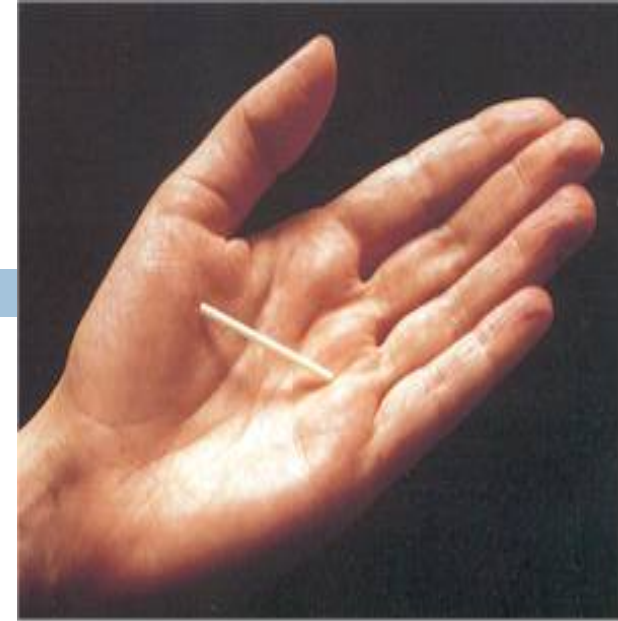
0,3 pregnancy per 100 women

□ Side effects :

- Changes in bleeding pattern (amenorrhea, spotting)
- Acne
- weight

Implant

- Nexplanon® Implanon®
 - One rod releasing 68 mg etonogestrel
 - 3 years
- Jadelle ®
 - 2 rods releasing 2 *75 mg mg levonorgestrel
 - 5 years
- Effectiveness (inhibit ovulation)
0,6 pregnancy per 100 women over the first year



Implant

more common side effects

Weight gain
(6%)

acne (14%)

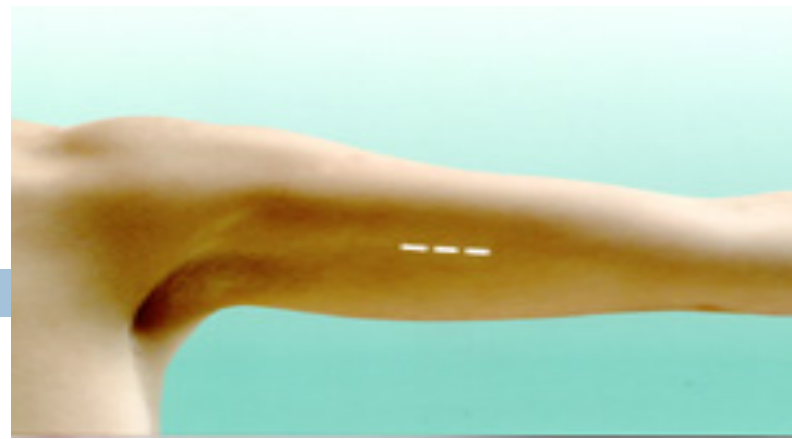
Amenorrhea
and spotting

Bleeding pattern the first 3 months

First 3 months predictive of the following months

Amenorrhea	18,6%
Infrequent bleeding (1-2 time/90 days)	26,9%
Frequent bleeding (> 6 times/90d)	7,2%
Normal bleeding (3-5 times/90d)	47,3%
Prolonged bleeding (>14j)	15,1%

Implant



□ When to insert implant?

- If no contraception : D1-D5 of cycle
- To switch from pills, ring, patch : any time
- To switch from injectable: any time before the end of the 3 months

□ To change for a new one?

Remove one and put the new one in the same localization.

video

Progestin-only Injectables

- Progestin used
 - Medroxyprogesterone acetate (DMPA)(Depo-Provera®)
 - Norethirone acetate NET-EN (Noristerat®)

Intra muscular injection

Every 3 months for DMPA

Every 2 months for NET-EN

- Effectiveness (inhibit ovulation)

1 pregnancy per 100 women over the first year

Progestin-only Injectables

- Side effects:
 - Changes in bleeding pattern
 - Irregular bleeding
 - Prolonged bleeding
 - Amenorrhea
 - Weight gain 1-2 kg (and more when overweight adolescent)
 - Headaches
 - Less libido
 - Loss of bone density

Indication of Progestin only-methods

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Can be given to

- Breast feeding (POP, Implant, injectable)
- women with some cardio vascular estrogen contraindications
 - Women more than 35yo and smoking (POP, Implant, injectable)
 - headaches/migraine with aura
- Women with symptoms linked to estrogen
 - mastodynies (macro progestin-only pill)
- Women who need long acting contraception (implant, injectable)

But also Barrier Methods

- Condoms (male and female) failure rate : 3-12%

- Spermicides (nonoxynol or benzalkonium)

Failure rate: 6-21%

Foams, gels, pessaries, sponge

- Diaphragm/cervical cap + spermicide gel

Failure rate : 5-21%

But also Biologically based method

- Cycle-based fertility awareness method

+/- computerized monitor

Failure rate: 1-9% for perfect users

20% for typical users during the first year

- Temperature method

- Cervical mucus method (Billing)

Mixed of these methods

Highly motivated and older couples

BETTER THAN NOTHING..

Vasectomy

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- Consists of cutting or sealing the two sperm ducts (vas deferens) that carry sperm from the testicles to the penis.
- Can be performed in few minutes on local anesthesia.
- Failure rate : 0,5 -1% during the first year
- Azoospermia is obtained after 2 to 4 months (or 20 ejaculations).
- Very rare complications (hematoma, infection, sperm granulomas)
- Should not be considered reversible (sperm conservation possible)

Female Sterilization

mini laparotomy or laparoscopy

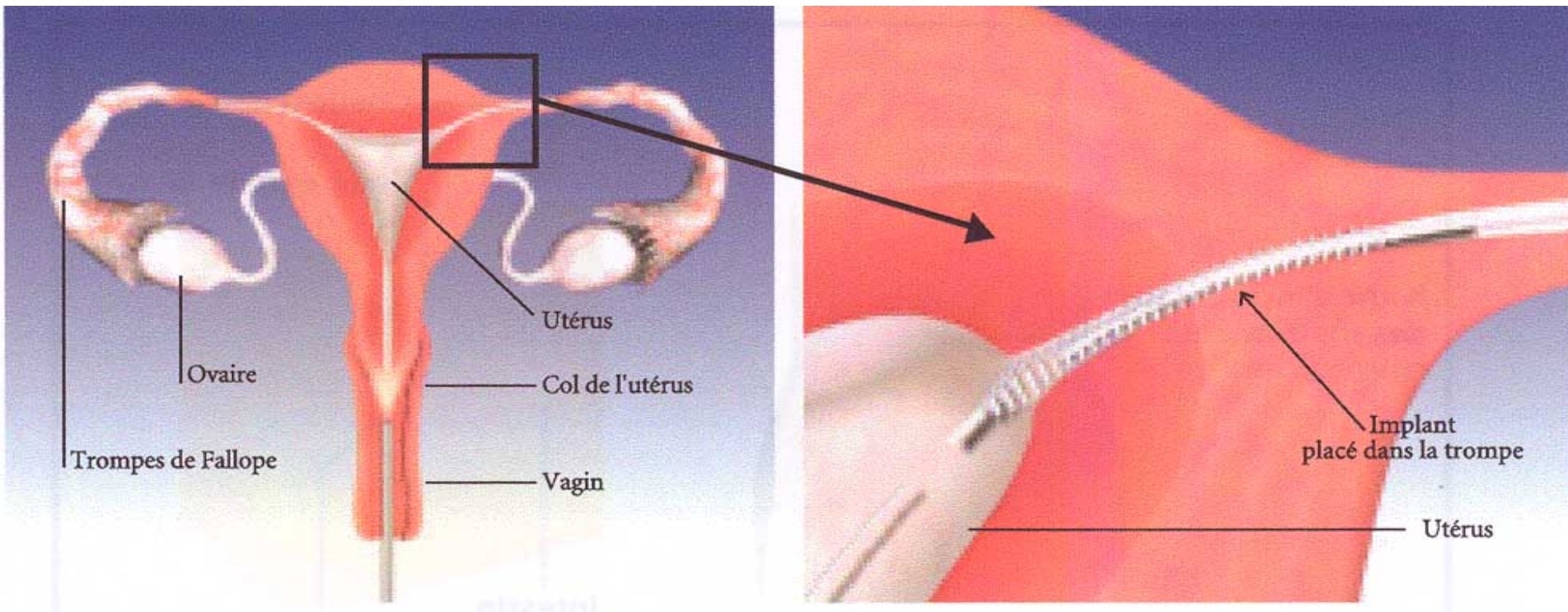
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- Mini laparotomy on local anesthesia or laparoscopy on general anesthesia or epidural or spinal blocks
- Different technics : cauterized, clipped, ties and cut banded
- Failure rate : 1 pregnancy per 100 women
- Should not be considered reversible

Female Sterilization

ESSURE technique

- Hysteroscopy +/- local or general anesthesia
- Insertion of a micro-implant in the fallopian tubes responsible of a progressive fibrosis (3 months to be effective).



Conclusion

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- Hormonal contraception and IUD are very effective methods but other contraceptive methods should not be forgotten
- Personal and familial medical history of the woman is crucial to prescribe safely hormonal contraception
- Contraindication to hormonal contraception are the same whatever the type of hormone, doses and routes.