

Baby Massage Oil

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The IAIM recommends scent-free, plant-based oil, cold-pressed if possible. *For babies in hospital please see special oil guidelines.*

Plant-based oil is often called vegetable or edible oil. The primary benefit of using plant-based oil for baby massage is that it makes the movement smoother on the baby's skin. Infant skin is very different from adult skin [Cooke 2018/Statamatas/Nikolovski]. In the first month after birth it has been recommended not to use ANY products on infant skin, (including oil) when the skin is in the process of developing its structure to the extra-uterine environment [Chittock & Cooke 2016]. Baby massage oil should act as a good medium for carrying out massage movements without causing drag or friction or leaving the baby feeling too greasy or slippery.

Every parent and every baby are unique so no specific oil can be recommended for baby massage. The CIMI ought to be aware of the different oils that they provide and then **the parents can choose their oil of choice.**

To make a decision of what oil to choose, it is best to consider:

- Individual/cultural/national preference
- Availability
- Skin type
- How and where (the environment) you are going to use and store it
- Cautions list
- Allergy risk. Check the highest allergy risks in your country i.e. Peanut (also called groundnut/monkey nut or arachis) and sesame are high allergy risks in the UK [The Anaphylaxis Campaign].
- Do a web search on the oil you are using, to check for any contra-indications. These research studies on oils may influence the choice of oil you use i.e. Olive oil (dermatitis) [Danby], Safflower oil (skin reactions) [Solanki], Flax oil (genotoxic) [Rojas-Molina] and Mustard oil (toxicity) [Darmstadt 2002] are a few examples.

Certified organic oil

This can be expensive and may not be freely available, as strictly speaking, not only must the seed be organically grown, but also the production process should exclude the use of chemicals. The quality of the starting material

- nuts, seeds, fruits - will also determine the quality of the oil.

True cold pressed oil

True cold pressed oil is generally more expensive, as it typically refers to oil extracted by hydraulic press without adding heat to the vegetable material. Unfortunately, "cold pressed" has no legal definition, and is therefore subject to some creative marketing shenanigans. In the European Union, for example, oil which is labelled as cold pressed must be produced in an environment which never exceeds a certain temperature. The temperature varies, depending on the oil, but is generally around 80 degrees Fahrenheit (27 degrees Celsius). These oils often have a distinctive odour and higher viscosity.

Most "**pressed**" vegetable oils, whether extracted by hydraulic press or expeller press, are heated to some degree, allowing more oil to be extracted.

"**Virgin**" and "**Extra Virgin**" typically refer to the first hydraulic pressing of oil (multiple pressings are typically used to get additional oil). These terms also have no legal definitions, so buyers beware. The typical marketing strategy for solvent extracted oil is not to mention how it was extracted!

Refined oil

This is usually cheaper; it is obtained from the vegetable pulp (which may be left after initial pressing) that still contains a reasonable amount of oil. It may then be subjected to a high temperature, high pressure process, or may be treated with steam and solvents. The refining process alters the character of the oil. However, it can also render the oils hypoallergenic and safer for consumption by allergic individuals [Hefle]. Allergy of oils is a subject that is constantly subjected to controversy and the bibliography does not cease to give contradictory examples [Fremont]. If there is a question of the child possibly being allergic to a specific oil the parents could do a 'patch test'. Recent research recommends that both positive and negative predictive values were better when the occlusion time was 48 hours.

Cautions for Baby Massage Oils

- **Mineral oil** (paraffin oil), which is used for some commercially produced oil/gel, is not an ideal medium for baby massage as it leaves the baby greasy (there is no evidence that it blocks pores as some people state). Mineral oil is a highly processed by-product of petroleum. Most mineral-based baby massage oils/gels have an added scent, which may cause irritation and is a potential allergen risk. The IAIM recommends no scents be added to oil because a sensitive newborn relies on the normal smell of their parent for bonding, feeding and sensory communication.
- Some baby massage oils have **essential oils** added. There is no evidence that these are appropriate for the immature system of neonates. For safety reasons they should be avoided. If the parents wish to use essential oils as a treatment, they can consult a qualified aroma-therapist who specialises in treating babies and their individual specific needs. Essential oils are sometimes added to baby massage oil, claiming therapeutic benefits such as that they are “relaxing” or “soothing” for babies.

All babies are unique human beings and should be valued as having their own personalities and physiological traits; we should avoid using ‘blanket’ medications (even very small quantities of essential oils can have medicinal effects). Some manufacturers produce a whole ‘baby range’ that contains essential oils. There is a concern that parents may unwittingly use them all together (on the skin, nappy area, hair, in the bath and for inhalation), which could be intensely overwhelming for the infant’s sensitive physiological system. There is no robust research to validate the safety of using essential oils for infants: those advising or prescribing these oils are advised to check their insurance cover.

- A **scented oil**, whether it is a natural or chemical scent, is best avoided as the fragrance can mask the obvious odour of rancid oil.
- Any edible oil has the potential to cause an **allergic reaction** – just as any food could do [Breiteneder]. If the infant’s skin is broken or they suffer from Atopic Dermatitis (a condition that causes the skin to become itchy, red, dry and cracked), the risk of being exposed to food allergens is greater [Lack]. The molecular structure of plant-

based oil ensures it mostly only absorbs into the uppermost surface layers of the skin [Zatz]. However, recently more evidence of transcutaneous absorption of topically applied ingredients in oil is being shown (in preterm as well as term infants) [Lin/Solanki]. Although we still do not know why eczema/allergies have become more prevalent we do know that eczema can lead to food allergies which in turn lead to hay fever and subsequently asthma in later childhood and adolescence. This progression is known as the allergic march [Lack].

- There is increasing evidence from research that **oil that is high in oleic acid** such as olive oil, is not recommended for use on infant skin as it is can cause an increase in skin permeability by disruption of the lipid barrier in the outer layers of the skin (stratum corneum) [Danby/Shao]. All oil manufacturers will send you a Material Safety Data Sheet, which will give you a breakdown of the components in the oil. You may have to specifically ask for the Oleic and Linoleic acid content to be included.
- Some brands of baby massage oil contain a **mixture of several oils**. This can make it difficult when trying to isolate the cause of possible skin reactions or allergies.
- Some manufacturers add Vitamin E to oil because it is stated that it acts as an antioxidant, which helps delay oxidization, giving the oil a greater shelf life. It is also thought to have skin enhancing properties. Some oil is already naturally rich in vitamin E. Caution is needed if you are using added ingredients in oils for baby massage. **Vitamin E that has been added to oil** can be derived from Cereal/Wheat germ which is not something that we encourage for babies under 6 months to ingest. It is also another ingredient than can be a possible allergen and if the baby has a reaction when you do a patch test, you will not know if that is due to the oil or the added ingredient.

Using Baby Massage Oil in a Hospital

For vulnerable premature or sick babies, who have unique skin problems [Hoath] and may have a poorly functioning immune system, it is may be safer to use a highly purified/refined oil. Refined oil, has almost no smell, is thin in texture, has a longer shelf-life (check the oil's Material Safety Data Sheet), and is less likely to contain any unwanted impurities, high lead levels, yeast moulds, fungal spores, or allergens, which can be present in some cold pressed oils. When choosing oil for in-patient use, check with the hospital's Paediatric Allergist, the ward Consultant and Manager, the Pharmacist and the latest Nursing & Midwifery Council recommendations.

Safety Issues

- Bacteria are not generally supported by oil. There is no evidence that application of refined oil to neonatal infant skin (when offering Positive Touch) causes any increased bacteria or fungal cultures [Darmstadt 2007].
- Oil application on premature infants has been shown to decrease the incidence of dermatitis by restoring the epidermal barrier. Thus, application of oil may improve outcome in neonates who are at risk with compromised barrier function [Darmstadt 2008/Soll].
- Edible oils are not generally absorbed into the systemic circulation, as the molecular structure of these oils is not conducive to trans-dermal transfer [Lee], however certain components, such as triglycerides, in the oil can be absorbed leaving the skin in better condition and increasing blood lipid levels (important in preterm infants) [Pourarian].
- Vegetable oil has not been found to be degraded by phototherapy, and there is no authentication of burning of preterm skin under lights or heaters after oil application [Lee/Nooper].
- There is no researched evidence to warrant the use of essential oils on infants in a NICU. The Nursing and Midwifery Council [NMC] documents standards for the administration of medicines which states that practitioners who use substances such as essential oils must be fully trained and competent. Also, they should recognise the importance of consent from the client (we should consider this to be the baby, as well as the parent); remember the practitioner must be accountable for their own professional practice

Allergic Properties of Edible Oils

Any food has the potential to trigger an allergic reaction.

- The allergens in oil are bound to protein molecules, which are too big to directly enter the blood stream via the skin route if the skin were healthy and intact. If the skin is inflamed or broken there is a risk that this could sensitize the baby, increasing the risk allergy in the future [Lack].
- When oils are highly purified (refined), allergen-bound proteins are mostly destroyed, so there is a reduced risk of the oil causing an allergy [Hourihane], however residual proteins have been found in some studies [Ramazzotti] so we should always be aware of that risk.
- Nut and sesame allergies are common and on the increase in the UK: the highest risk is peanut allergy which can be life threatening [Ewan]. Allergenic proteins may be found in the refined oil due to cross contamination with other oil products [Olszewski]. Check the Anaphylaxis Campaign website for more information.
- To have an allergic reaction one must first be sensitized. A newborn infant may already be sensitized to allergens transferred genetically, or in-utero via the placenta. The breast-fed infant may be exposed to human milk-borne allergens derived from foods the mother has eaten during lactation. [Lovegrove '94].
- There is an increasing prevalence of childhood eczema affecting over 20% of children in the UK. This is not just due to genetic predisposition, but may be due to many environmental factors, including the use of products including both 'natural' and/or commercial skin care products (Lack 2018).

Oil and Oxygen

There is 21% oxygen in the air we breathe; the extra oxygen that babies at home are receiving, usually via nasal prongs (often called low flow), hardly alters this percentage. However, **caution is always needed when using oxygen.**

Safety guidelines concerning oil are often misinterpreted by numerous health professionals. This information has been obtained by many months of searching for scientific and technical evidence.



The danger is in handling and replacing the oxygen cylinder. Oxygen is under high pressure in these cylinders and when the cylinder needs replacing the pin regulator is released - a loud hissing sound can be heard (see diagram). This is a rare but possible stimulus that may cause a spark. Any flame added with oxygen can cause combustion.

Therefore, there should be no oil, gel or lubricants present on the cylinder or on the hands or clothing of the person when touching or changing the cylinder.

It is also important that the cylinder does not go back to the filling company with oil residues on them.

There is no evidence or guiding principles to prove that at any other time babies receiving supplementary oxygen at home would be in any danger when they receive massage with oil.

Information supplied, with thanks, from Paul Jones, Consultant Scientific Officer (Principle Advisor for the NHS).

Bottles and Lids

Colour of bottles

Dark bottles protect the oil from sunlight exposure so can extend the life of the oil.

Clear bottles make it easy to show parents the colour of the oil and to observe any unwanted sediments. I once had sediment in the oil so was glad I could see it.

Plastic bottles are good in that they are safer for babies to handle than glass but some plastics can contain unwanted ingredients and one needs to use a reputable manufacturer.

PET plastic bottles, unlike PVC, are fully recyclable and put in landfill, degrade without leaching any chemicals into the soil. When sterilising PET plastic bottles, they should not be heated above 50°C as they will deform.

Sterilisation should be carried out using cold use sterilizing fluid.

High Density Polyethylene (HDPE) is more robust and can be sterilised at a higher temperature than PET.

Lids

I personally don't like the flip top caps where the lid flips up and underneath there is an incurve surrounding the hole, as the incurve can collect oil that just sits there and gets old/sticky etc. Also, they often leak in parents' bags.

I recommend the lids that have a nozzle (I like these because the older babies find it more difficult to open) or a click disk-top lid like a shampoo top.

Sunflower Oil

Botanical Name: Helianthus Annuus

The Sunflower originated in America, where it was worshipped by the Aztecs as a representation of the sun. The seeds were eaten toasted or turned into meal and the plant was brought to Europe at the end of the 16th century. They are seeds are still eaten today just like nuts, and the buds used like artichokes [Kusmirek]. Sunflower seeds contain an oil yield of 30% (although some modern varieties contain 50%) [Skoric].

Cold-pressed high-quality sunflower oil is dark yellow in colour and has a distinct strong 'nutty' aroma.

Oil which is pale in colour and odour-free will have been subjected to some kind of refining process. There is genetically modified sunflower oil that has been modified so that it is high in oleic acid (which is good to ingest but not good for skin). Several studies on oleic acid wanted to increase the range of drugs for which transdermal delivery is a viable option aid transdermal permeability. Looking at the effects of oleic acid on skin, showed oleic acid can increase epidermal permeability [Jiang/Mack].

Sunflower oil has particular positive attributions to recommend its use for baby massage:

- It has a lovely light texture, which is very pleasant to use, leaving the skin with a satin-smooth, non-greasy feel.
- Sunflower oil is the most widely grown edible oil crop. It is produced and sold in large quantities so it likely to be fresher than a more infrequently sold product, which may be sitting on the shelf waiting to be sold for a long period of time.
- It has natural, relatively high levels of Vitamin E, and antioxidant properties [Skoric].
- Given its high content in essential fatty acids, sunflower oil presents restructuring, regenerative and moisturizing properties, improves barrier function, and enhanced essential fatty acids, particularly linoleic acid, which has skin barrier-enhancing properties. It has been suggested that it might also be efficacious in atopic dermatitis [Danby/Eichenfield].
- Research studies demonstrate evidence that the properties in sunflower oil have an anti-microbial effect [Sechi], which can be life-saving in preterm infants [LeFevre].

- Research in Spain [Rojas-Molina] showed sunflower cooking oil not to be toxic.
- Studies in a Neonatal Unit showed that using sunflower oil resulted in a significant improvement in skin condition and a highly significant reduction in the incidence of nosocomial infections and mortality [Darmstadt]. It has a potential to improve weight gain [Taheri/Fallah] and cause less weight loss in low birth weight babies [Kumar]. Weight gain may also help to promote early discharge home [Taheri]
- It is not commonly associated with allergic reactions. However even refined sunflower oil, may contain minute trace elements of allergen, therefore sunflower seed-sensitive people should avoid all sunflower oil products [Zitouni].
- There has been one pilot study that showed Sunflower oil can alter neonatal skin barrier in the first 4 weeks after birth [Cooke 2016]. However there was no follow-up study to show that this finding leads to long-term problems or eczema [Norlen].
- Plant-based refined oil should not be stored in extreme temperatures. Do not store in a fridge as it can cause clouding and separation of the oil, as the oil's natural waxes have been removed.

Refined sunflower oil has been successfully used on the Neonatal Unit at Queen Charlotte's and St Mary's Hospital, in London. It is food grade (can be ingested) and meets BP (British Pharmaceutical) and food federation standards. The sunflower oil is produced by an alkali refining process i.e. it is refined, deodorised and heat-treated. This oil is clear pale yellow in colour and has no odour.

The oil is bottled and labeled by Huddersfield Royal Infirmary Hospital Pharmacy (01484 342746) and supplied in 50 ml plastic bottles. It is manufactured in the UK [William Hodgson Co.].

Coconut Oil

Botanical Name: *Cocos Nucifera*

The coconut palm is grown in many tropical areas, with the Philippines and Indonesia being the most important regions in terms of international trade.

Coconut oil is extracted from the white flesh of the coconut, which when pressed yields an odorous solid fat that has therapeutic properties. The white flesh of the coconut has an oil yield of up to 65%, making it the highest yielding of traditional oil-bearing materials, and contains over 90% saturated fatty acids [NEODA]. It is low in Oleic acid – less than 10%, so may be a preferable choice oil for use on infant skin.

The whole oil (unfractionated) is wonderful for baby massage with babies who are not in hospital or those who do not have immune or coconut allergy problems. Storage temperature of this 'whole' oil needs to be lower than that in a NICU.

- Virgin coconut oil was found to be effective for topical treatment of wounds [Nevin].
- Topical virgin coconut oil resulted in enhanced skin condition when used in premature babies [Strunk]
- Agero and Verallo, showed coconut oil and mineral oil have comparable effects. Both oils showed effectivity through significant improvement in skin hydration and increase in skin surface lipid levels. Parent observational studies showed a general trend towards a better improvement with the coconut oil.
- It is rare for coconut to cause an allergic reaction and should a reaction occur it is usually mild [Dr Lack/Benidito]. The process of fractionation removes most of the proteins to which the allergens are attached.
- There have been studies to show coconut oil has an antibacterial qualities (Lin)
- There have been studies demonstrating the presence of cross-reactive allergens between tree nuts such as hazelnut (tree nut) and coconut (a distantly related palm family member), [Roux/Nguyen].

Fractionated Coconut Oil

This is probably safer for use in hospital situations as it is highly refined. To extract the fractionated oil, this fat is subjected to heat and the top liquid fraction is removed [SCOPA].

- This fractionation process purifies the oil removing the fungal spores, pesticides and yeast moulds that may be present in some unrefined oils.
- Fractionation produces perfume-free oil that stays in liquid form.
- Fractionated coconut oil does not oxidise ('go off') as quickly as other oils. The stabilization quality of this oil is particularly advantageous when used in a warm environment such as the NICU.
- Coconut oil massage resulted in significantly greater weight gain velocity as compared to mineral oil [Sankaranarayanan].

Olive Oil

Botanical Name: *Olea europaea*

Professor Michael J Cork, the University of Sheffield, UK states:

"In dermatology, olive oil may be used to break down scaly skin as in seborrheic dermatitis (cradle cap) of the scalp in a baby. But due to its desquamation properties it should not be applied to most healthy babies as it could break down their fragile skin barriers. Anything that breaks down a baby's skin barrier may contribute to the development of atopic dermatitis".

What is Oleic Acid?

Oleic acid is a monounsaturated fatty acid found naturally in many plant sources and in animal products. Oleic acid makes up 55-80% of olive oil. To find out the oleic/linoleic acid content of the oil one uses you need to ask the manufacturer who supplies the oil.

The Role of Oleic Acid in the Skin Application of Drugs

The skin, in particular the stratum corneum, poses a formidable barrier to drug penetration thereby limiting topical and trans-dermal bioavailability. Skin penetration enhancement techniques have been developed to improve bioavailability and increase the range of drugs for which topical and trans-dermal delivery is a viable option. Dermal patches applied to the skin, like hormonal or nicotine patches, are delivered into the body by using a concentrated amount of oleic acid [Benson].

- Contact allergy to olive oil has been described in several papers on adult skin [Danby] and in masseurs who use this oil [Williams]. However, there are studies that suggesting that these reactions are not due to allergy but rather that olive oil can be a skin irritant [Kränke/Danby]. This would support professor Cork's theory.
- Numerous people in many cultures have reported using olive oil for baby massage. As baby massage instructors we should simply give the facts and the evidence we have at this moment about the oil we are using. If parents ask us then we have a responsibility to say that a dermatologist has cautioned against using olive oil on babies' immature developing skin.
- Olive oil may be a little heavy and sticky for baby massage, with a strong odour.

- In animal studies, olive oil application was not found to improve epidermal barrier function. In the same study sunflower oil showed significant skin barrier recovery [Darmstadt 2002].

Olive Oil and Oleic Acid in Our Diet

One of the chief sources of oleic acid in foods is olive oil, perhaps one of the tastiest cooking oils.

Oleic acid is an omega-nine fatty acid, and considered one of the healthier sources of fat in the diet. It can lower total cholesterol levels thus slowing the development of heart disease, and promotes the production of antioxidants. One very interesting use of oleic acid is its use as an ingredient in Lorenzo's oil, a medication developed to prevent onset of adrenoleukodystrophy (ALD), a condition effecting only young boys that attacks the myelin sheaths of the body, causing symptoms similar to those in multiple sclerosis.

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This article has evolved following creation of guidelines for the oil I have used in Neonatal Unit and post-discharge baby massage groups.

The content on these pages has been taken from the above resource references and is subject to alteration when new information comes my way, so please feel free to contact me with comments and updates.

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