

METHYLCOBALAMIN (“B₁₂”) INJECTION INSTRUCTIONS
TO BE MADE FROM 25 MG/ML METHYLCOBALAMIN, PRESERVATIVE FREE FORM ONLY!
STARTING DOSE TYPICALLY 64.5 MCG/KG EVERY 3rd DAY SUBCUTANEOUSLY (BUTTOCKS)
IMPORTANT: BE SURE TO REQUEST PREFILLED BD 3/10 cc INSULIN SYRINGES CALLED “SHORTS”
BD ITEM # 328438 (NOT #32418!)

PLEASE NOTE: YOUR CHILD’S DOSE IS THE SMALL CONTENT OF ONE PRE-FILLED SYRINGE

KEY POINTS UNDERLYING SUCCESS OR FAILURE:

- a) *All types of fat are not equal and different types of fats have different dissolution and dispersion constants. From my studies, the fat from the region of the buttocks significantly outperforms the results of injections made into the fat of the arms, legs, or belly.*
- b) *Because my clinical research indicates the methyl-B₁₂ phenomenon is due to a dependency condition, not a deficiency syndrome, subcutaneous injections into the fat of the buttocks allows for a leaching effect that can provide a “24/7” slow release into the tissues. By contrast, injections into muscle quickly saturate B₁₂ receptors, correct any deficiency that may be occurring, and temporarily treat any dependency that is also present. After the B₁₂ receptors are saturated, the excess methyl-B₁₂ not bound to receptors will be filtered from the blood by the kidneys and excreted into the urine within 30-45 minutes after the injection. If the volume of the red methyl-B₁₂ shot is large enough, the next urine specimen will be red or it will be some color of red depending on the concentration of the urine. If, however, the volume of the red methyl-B₁₂ shot is small, the urine will not show red or pink even though the methyl-B₁₂ is filtered through the kidney into the urine within the same 30-45 minutes after being injected. Unfortunately the effects of intramuscular injections are quite confusing to parents and clinicians. Many children will show a response to some degree, often to a very noticeable degree. However, when compared to subcutaneous shots to the buttocks, the duration of the response is shorter; the intensity of the response, over time, will be less; and because of this combination of factors, many parents will discontinue shots months prematurely before realizing the full effect of methyl-B₁₂ for their child. A couple of additional points must be made about intramuscular injections. Should you give your child a shot and see a response within minutes or a couple hours instead of many hours to days, you are giving the injections intramuscularly. Subcutaneous adipose tissue in the buttocks is not vascular enough to deliver enough methyl-B₁₂ fast enough to produce a significant clinical response in such a short period of time. If my dosing schedule is being followed and you see that the urine is pink or red, the methyl-B₁₂ shot was undoubtedly delivered into the muscle no matter how much you believe the injection was given subcutaneously. Subcutaneous injections cannot deliver enough “red” methyl-B₁₂ fast enough to be cleared by the kidney and show red in the urine unless the volumes are huge, significantly greater than any that I commonly use.*
- c) *Because of the above discussions, a constant steady state can be achieved in most individuals with a shot frequency being adequate once every three days if fat from the child’s buttocks is used. I use the following example, not to be gross or disgusting, but rather because it allows you to easily visualize and remember the concept. To visualize what happens to a methyl-B₁₂ shot in the fat in the buttocks may be hard to do unless we ‘magnify it’. Therefore, let’s think about an “elephant’s butt” instead. Let’s say there are 12 inches of fat between the skin and the muscle below. Our goal is to insert a red lollipop right in the middle of this foot of elephant butt fat – 6 inches under the skin and 6 inches above the muscle. Because fat is moist and because lollipops dissolve whenever they come in contact with moisture, imagine the diameter of the lollipop gradually getting smaller and smaller until it is totally gone 3 days later. This is analogous to injecting a dense concentration of methyl-B₁₂ into the subcutaneous fat in a child’s buttocks – a process of slow steady release over 3 days. By contrast let’s revisit the elephant’s butt and insert the lollipop in the muscle. Because muscle has lymph and blood constantly in motion, the lollipop continually has blood and lymph “washing over it” and the lollipop will dissolve much more quickly, similar to what would happen if it were in a bowl of water that was gently being rocked back and forth. As this illustration shows, the lollipop in the bowl will be completely melted within an hour. Should the lollipop have been inserted right at or very close to the subcutaneous/muscular junction, an effect somewhere in between the two extremes would be noted.*

- d) Clinically speaking, methyl-B₁₂ injections, when truly delivered into fatty tissue in the buttocks, appear to disperse over a 3-day period “on average”. Therefore, the first place you need to look when the benefits of a methyl-B₁₂ shot seems to wear off too soon is to retry the shots at the same dose and frequency but make the angle of attack much more severe, much closer to the horizontal plane, just under the skin. In children that are extremely thin or extremely young that have essentially no fatty tissue on their buttocks, I have found that injections given every day or every-other-day, still just under the skin, seem to overcome the problem and allow the benefits of methyl-B₁₂ to be seen. However, I do not keep the dose the same. Instead I make the dose of each shot proportionately less depending on whether it is given every other day or every day. For example, a dose of 750 mcg per shot every 3 days is equivalent to a shot of 500 mcg given every other day and equivalent to a shot of 250 mcg given daily.
- e) *Common errors in technique:*
- a. *Pinching the fat:* Professionals often teach parents to “pinch the fat” to give a subcutaneous injection. Unfortunately with small children, the “tenting effect” that occurs not only brings with it subcutaneous fatty tissue but also “a ribbon of muscle” that is just as likely, if not more likely to receive the medication that is thought to be being administered into the subcutaneous tissue. The discussion above has already shown that in my clinical experience intramuscular injections are significantly inferior to those received in the fat in the buttocks. Therefore, **NEVER PINCH THE FAT** to insure a subcutaneous injection. Instead, go as shallow as necessary, often just under the skin in order to deliver the methyl-B₁₂ into subcutaneous tissue.
 - b. *Angle of injection too vertical:* As discussed above in detail, the angle of injection may not be severe enough in young children who have very little fat to deal with in order to hit fatty tissue and not muscle. Therefore, the thinner the child, the more closely the angle of the shot should be to the horizontal than the vertical plane as it enters the skin. At times you may need to inject just under the surface of the skin to accomplish this goal.
- f) *Safety issues:*
- a. *The safety of the shots is unquestioned if administered from a BD #328438 needle.* This needle is only 8 mm in length and when the shot is given at a 30 degree or less, as is the technique taught, the “effective length” is only a small fraction of the original 8 mm length.
 - b. Clinicians have always taught patients to use the upper outer quadrant of the buttocks to avoid injury to the sciatic nerve that could be reached if a regular sized needle was used in the lower portion of the buttocks. However, with the BD #328438 extremely short needle length of 8 mm, even if injected “straight in” over the area of the sciatic nerve, the chances of hitting it in anyone except the smallest preemie is impossible. With the angle of injection being anything significant, *it is impossible to hit the sciatic nerve.*
 - c. By applying simple trigonometry, one of the professionals whose child is a patient of mine gave me this “rule of thumb” if a BD #328438 needle is used as per my protocol: a) shots injected at a 30 degree angle give an effective needle length of approximately 4 mm ; b) shots injected at a 20 degree angle give an effective needle length of approximately 2.7 mm ; c) shots injected at a 10 degree angle give an effective needle length of approximately 1.4 mm.

Special Consideration Regarding The Local Anesthetic You Have Purchased ***Do This Before Administering Your First Shot***

Parents are able to obtain different types of local anesthetic creams from different compounding pharmacies as prescribed by different clinicians. Clinicians “have their favorites”. Some are commercially available and are standardized as to effectiveness. Those produced by different compound pharmacies can have different percentages of ingredients and different combination of ingredients. Therefore, some local anesthetics will act more quickly and/or wear off more quickly. What I suggest for all my patients is that they put the cream on the sensitive portion of their inner thighs and take a pin and make a chart as to how soon they do not feel pain from the pinprick and how long it takes before they feel it again. With such a chart, the parents can know with confidence how long they should wait before they give the shot and how much time they have before the local anesthetic will no longer be active.

Method 1: (Read this first for the “big picture”; then compare with Method 2)

(Quick; essentially painless; rarely felt by the child at all; and most children never wake up)

IMPORTANT NOTE: most parents only need to do this until they become comfortable giving their child the shot. Afterwards, they usually find this procedure not necessary.

1. Take a Band-Aid. Fold the edges back onto themselves so you can easily pull the Band-Aid off later without having to “scrape” the edges and awaken your child.
2. Put some BLT/EMLA cream on a “meaty spot” of the upper outer quadrant of a buttock just under the diaper or underwear so you can gently slide it over without later waking your child. Note: EMLA cream is difficult to obtain. Other local anesthetic creams are available from your pharmacy with a prescription. I use “BLT cream” from Hopewell Pharmacy. All the compounding pharmacies can make the same or similar preparation. This works very well.
3. Apply the Band-Aid over the area that contains the local anesthetic cream.
4. ***Mark the edges*** of the absorbent part of the Band-Aid so that once you remove the Band-Aid, you will have made ***a target*** where to insert the needle. You do not want to be off slightly or your child will feel the prick of the needle.
5. Allow the child to go to sleep.
6. The anesthetic cream needs to be in place for approximately 45 minutes to be maximally effective if it is prilocaine/lidocaine, like EMLA. The effect comes on much more quickly, usually within 15 minutes if it is a combination of benzocaine, lidocaine, and tetracaine. The effects of all of them will usually last another hour.
7. Do the following in *quick succession*. You may want to *practice* the moves first using an orange or the arm of a sofa that is covered with material (not leather).
 - a. *Gently* pull the Band-Aid off and wipe away the anesthetic cream with an alcohol swab trying not to awaken your child. ***Be sure that the area and/or the adjacent area has not been soiled with fecal material. Be careful to clean the area thoroughly with alcohol.***
 - b. Note the “*target area*”. With your thumb and 3rd finger holding the middle of the syringe (similar to holding a pencil or pen but with different fingers) and your index finger on the plunger of the syringe, *quickly* insert the needle **AT A 10-30 DEGREE ANGLE** (this way it is impossible to go “too deep”) until it stops at the hub of the needle/syringe. (Think of this move as similar to *tossing a dart*.) This also allows for the injection to go **into the subcutaneous fat** and because of a “slow-leaching effect” gives **better results** than if injected into muscle.
 - c. *Immediately* inject all of the solution within 1-2 seconds.
 - d. *Quickly* withdraw the needle and *immediately* put it into the “**sharps container**”. (See “Sharps Container” below)
 - e. If you do everything gently, your child will usually not awaken. If you do everything quickly and if your child does awaken, you “will be there” to comfort him/her immediately and your child will not know that an injection has occurred.

METHOD 2: (Easier to do and the PREFERRED METHOD by most parents that continue to use the cream)

Do everything exactly as above except rather than putting a Band-Aid on, rub the cream into the area where you are going to give the shot. When using this method, apply the cream over a larger area so that you don’t accidentally miss your target when you give the shot. The area will be numb in 15-45 minutes but you should follow your chart [see “Special Consideration” above].

Problem, Type #1: Child That Resists Allowing You To Put On The Local Anesthetic Cream But Does Not Awaken Once S/He Falls Asleep:

Wait until your child is in a deep sleep. Then apply the anesthetic cream. Wait 45 minutes and then proceed as above.

Problem, Type #2: If Your Child Is A Light Sleeper And Awakens Whenever You Attempt To Give The Shot At Night, Switch And Give The Shots During The Day:

I do not recommend alarming a child, scaring a child, or having a child always needing to “guard his butt” from the boogeyman that’s always trying to attack him while he’s attempting to rest in peace! Therefore, with these children it is much more important just to teach the child that the shot is a part of life, just as with a diabetic child. I do not recommend a reward system unless it is absolutely the last straw. The shots are as important as insulin to these children and therefore they need to be administered. Therefore it is a learning experience for both the child and the parents how to do this with the least emotional trauma and the least negotiations possible. After the first few shots, the child will learn that they do not hurt (if the creams are used) and will therefore be less resistive or not resistive at all. Surprisingly it is not uncommon for children to ask for their shots! When children ask for the shots to be given, obviously something good must be happening!

!PAIN?--?PAIN!--!PAIN?

Your child should feel no pain at all for the majority of the shots you administer. The following should be considered whenever you are trying to decide if your child is feeling “movement” by you when you give the shot, a “sensation of fullness”, or “true pain”.

1. Shots should not hurt if the pH is correct. Occasionally compounding pharmacies do not adjust for this or a bad batch occurs for other reasons. In my experience, this is the most common cause for painful shots when they occur. After prescribing over 50,000 shots and monitoring them personally, I can undeniably state that pain has only been reported on very rare occasions when parents used my supplier. I believe other suppliers can also produce “good shots”. However, in my opinion, there needs to be some type of standardization between all compounding pharmacies in order to guarantee a painless and potent formulation so that all parents can administer the shots without the fear of pain in order to obtain the benefits methyl-B₁₂ frequently provides.
2. Even in perfectly administered shots, at times there may be a set of nerve fibrils that are closer together or more sensitive than others or at times even clumps of nerve fibrils that are present in “knots”. One cannot know ahead of time where these anatomical variations are located. If a child “accidentally” receives a shot in such a location, some discomfort or mild pain may be felt, especially if the local anesthetic cream wasn’t applied properly, long enough, or for too long a period of time. As a general rule, if the injection site is moved an inch or two, the next shot should be fine.
3. The larger the volume of a shot, the more pressure effect/tissue stretching effect that may occur and in a sensitive child cause a feeling of discomfort. This is one reason to use the most concentrated shot concentration possible. It also important to remember that the sensation of “fullness” may cause a child to “touch the spot” where you administered the shot but this does not necessarily mean that this is a “painful sensation”. Large children, due to a larger shot volume of 0.15 cc or greater, may feel this fullness and occasionally slight pain.
4. If you really think something may be wrong, give yourself a shot and see if it is painful. If it is, either have the pharmacy give you replacement shots from a different batch, or use a different pharmacy. Should you receive a new set of shots from the pharmacy that previously provided the painful shots, ask for an additional shot so you can inject yourself before injecting your child to see if the problem has been corrected.

Sharps Container:

It is important to make sure that needles are discarded properly. The following description will allow you to make a homemade version of a sharps container. Please do the following:

1. Obtain a large coffee can that has a plastic lid.
2. Throw out the coffee. Wash and dry the container.
3. Make two slits at a 90-degree angle to each other in the center of the plastic lid.
4. Securely tape the lid to the can.
5. Check to make sure that you can push a syringe through the slits but that the slits are not wide enough for “little fingers” get through.
6. When the coffee can is full, securely tape it shut by covering the slits.
7. Once secured, the can may be disposed with normal trash. It is perfectly legal for “personal” medical waste to be disposed in this manner [in contrast to biohazardous waste generated in a hospital or clinic].