



Physicians Products Inc.
A Physician's Management Company



PRP
USER'S
MANUAL

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I. Blood Donor Selection

1. Blood Donor's Characteristics

1) Male

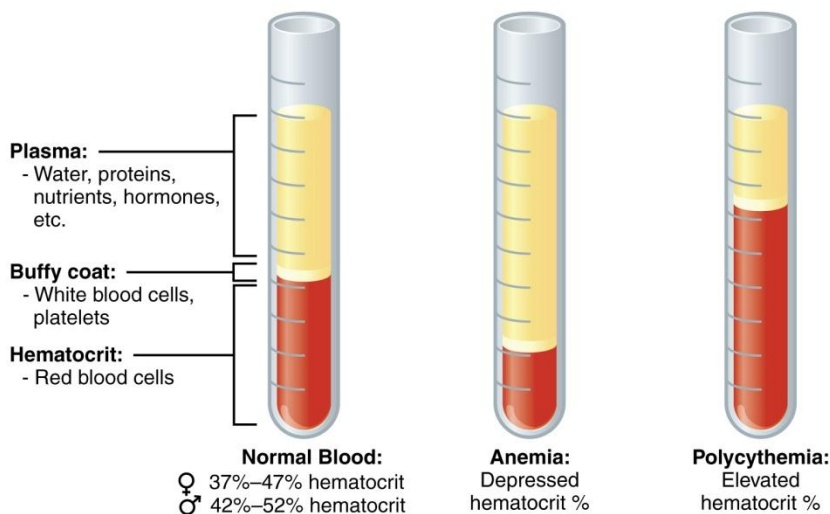
- A young and healthy man is the best blood donor for PRP treatment.
- Normally, the size of male's Red Blood Cells(RBC) tends to be larger than that of female's or anemia patient', therefore; the height of RBC can relatively be high after the spin.

2) Female

- Normally, the platelet counts of female's are lesser than that of male's.
- The size of female's RBC tends to be smaller than that of males.

3) Anemia Patient

- A young and healthy man is the best blood donor for PRP treatment.
- Normally, the size of male's Red Blood Cells are larger than female's or anemia patients'.



4) Old-aged Patient

- A young and healthy man is the best blood donor for PRP treatment.
- Normally, the size of male's Red Blood Cells are larger than female's or anemia patient'

The operator of PRP treatment should check if the blood donor has any particular conditions that must be considered before drawing blood.

2. Precautions To Blood Donors

- Stop taking anticoagulant or antithrombotic medicine such as Aspirin 2 weeks before from the PRP treatment.
- Consult your doctor in advance if you have any blood disease, thrombotic disease, or arrhythmia.
- Notify your doctor in advance if you are suffering from serious anemia.
- Don't drink alcohol too much and refrain from smoking before the PRP treatment.
- Eat lots of fruit especially containing vitamin-C a lot.
- Take a deep sleep.
- Try to get away from much stresses.

The better conditions the patient has, the better result will be shown when harvesting buffy coat. If the patient is in a bad condition, buffy coat might not be concentrated well.

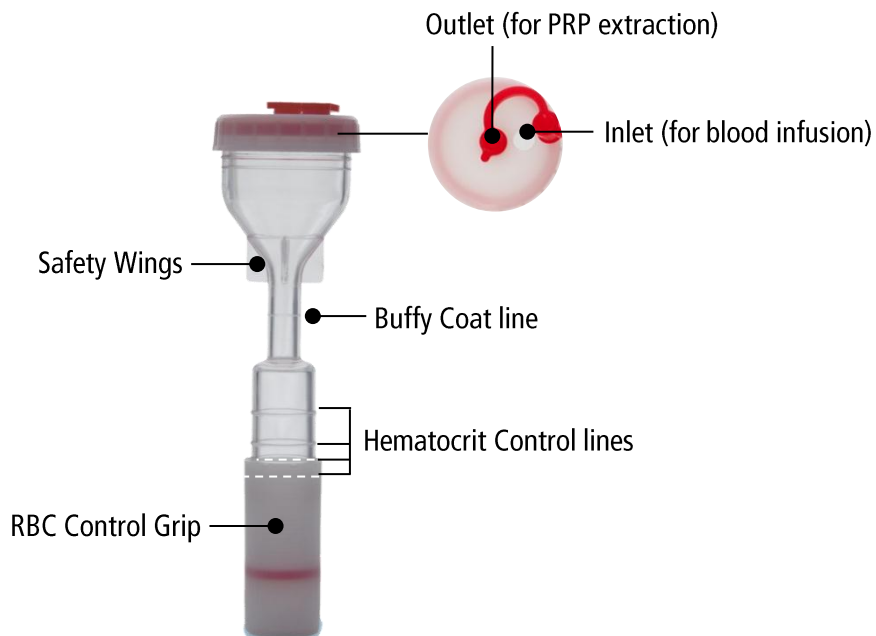
II. Preparation

1. Needed Supplies (for 1 EA)



- Ycellbio Tube (1 pcs)
- Blood (15 ml)
- Anticoagulant (1.5 ml)
- 20cc Syringe (1 pc)
- 5cc Syringe (1 pc)
- 3cc Syringe (1 pc)
- 21G Needle or Butterfly Needle (1 pc)
- 18G 1 ½ Needle (2 pcs)
- Alcohol-soaked cotton / Forceps

2. Features Of YCEL BIO Tube



3. Which Anticoagulant To Use

There are several choices of anticoagulant that support the metabolic needs of platelets and the viable separation of platelets in an undamaged manner.

1) Preferred Anticoagulant

- ACD-A (Anticoagulant citrate dextrose Solution- A)
- Sodium Citrate



ACD-A



Sodium Citrate
(4g / 100ml)

2) Inhibited Anticoagulant

- Heparin : Heparin may obstruct PRP activation.
- EDTA :EDTA is poisonous and it may damage platelet membrane.

4. How Much Of Anticoagulant is Required?

1) 1.5ml of anticoagulant is needed for 15ml blood sample.



Draw anticoagulant



Syringe coating

2) Before drawing blood, coat the inside wall of syringe with anticoagulant.

III. Blood Collection

1. Blood Draw

1) Draw 15 ml blood.



21G Needle



Butterfly Needle

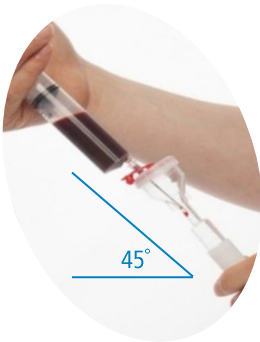


2) Mix blood swinging the syringe slowly.

※ Cautions

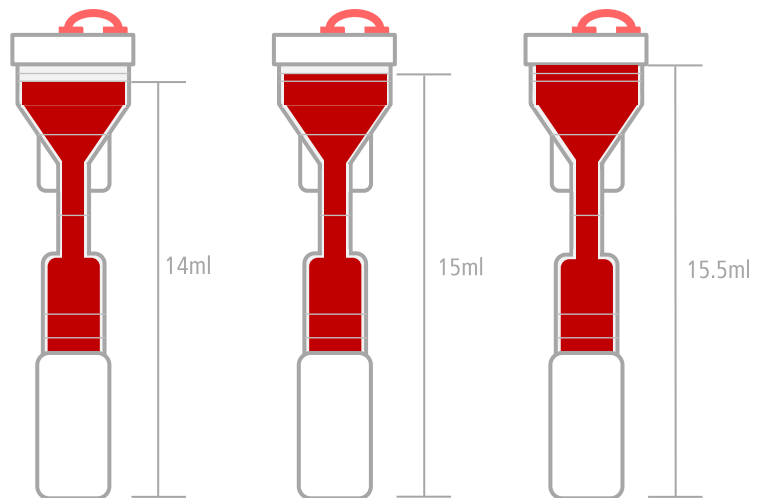
- Before taking blood, take out air pressure in the syringe by pumping 2~3 times.
- Don't draw blood too strongly and fast. When you draw blood, take it softly and slowly. If you force blood to be taken with too much strength or speed, cells in blood could be broken.

2. Blood Transfusion Into Tube



1) Use **18G** needle.

2) Transfuse the gathered blood into YCELLBIO tube (maintaining a slope of 45°)



Male

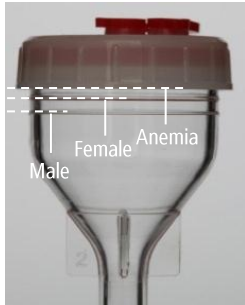
Female

Anemia

Blood	12.5 ml	13.5 ml	14 ml
Anticoagulant	1.5 ml	1.5 ml	1.5 ml
Total	14 ml	15 ml	15.5 ml

※ Cautions

1) Blood Volume Guidelines



As mentioned earlier, Anemia patient's blood tend to get easily depressed after centrifugation. (Anemia > Female > Male). Therefore, more blood should be gathered for patients whose blood is vulnerable to Hematocrit depression.







2) Blood clogged in the middle of the slim neck



If the blood is clogged in the middle of the slim neck while transfusion, press the syringe a little harder.

IV. Centrifugation

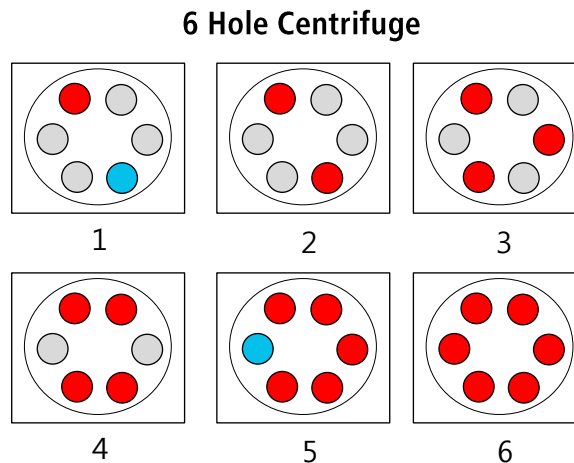
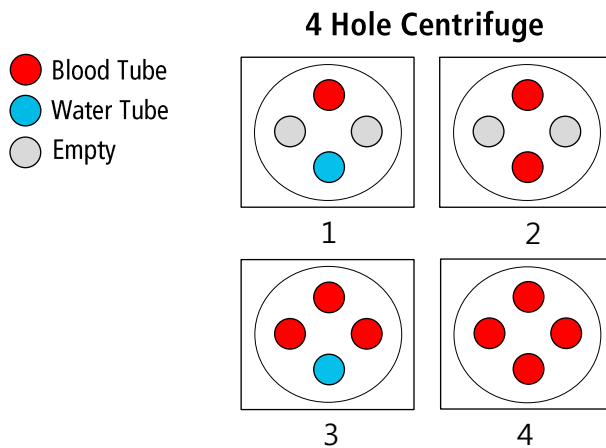
1. Centrifuge Protocol

	Digital		Non-digital
	Swing	Angle	Angle
Type			
			
RPM	3200~3300	3600~3800	3400~3600
RCF	1888*g ~ 2008*g		
Time	6 min ~ 10 min		

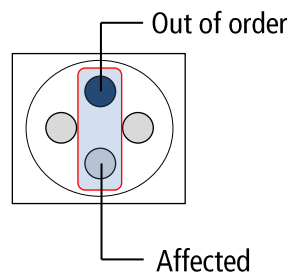
Digital type set automatically RPM following RCF. Therefore, set RCF first as the above instructed RPM can be different from model to model.

2. Centrifuge Balance

Centrifuge balance is one of the most significant factors in the blood separation process. Centrifuge imbalance can cause breakage of tubes in the centrifuge or a blood leak in the course of a spin.



If one bucket of a centrifuge has a defect, the opposite bucket can be affected while spinning. As a result, tubes in both buckets may be broken and blood leaks.

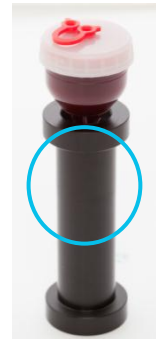


3. Centrifuge Adaptor



A

If you have this kind of centrifuge seen in the photo A, check if the head of the tube reaches the central rotor. If so, tubes might be broken while spinning.



An adaptor should cover the tube up to the safety wings.



Without an adaptor

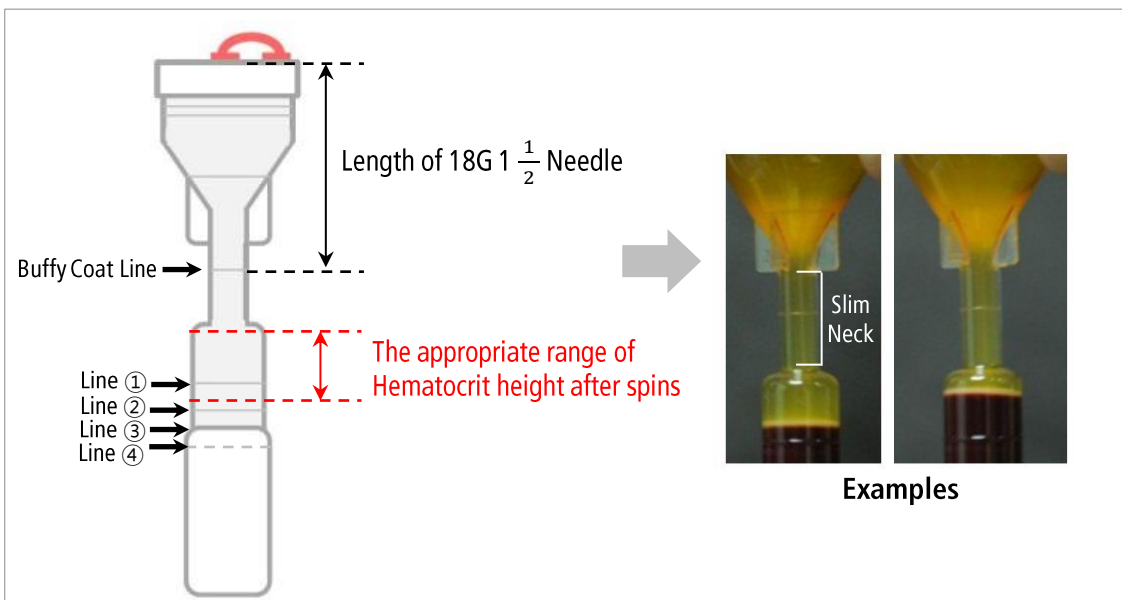


With an adaptor

You can take a spin not using adaptors, but adaptors protect tube making it stable during the spin if the bucket size of the centrifuge is larger than the diameter of the tube bottom.

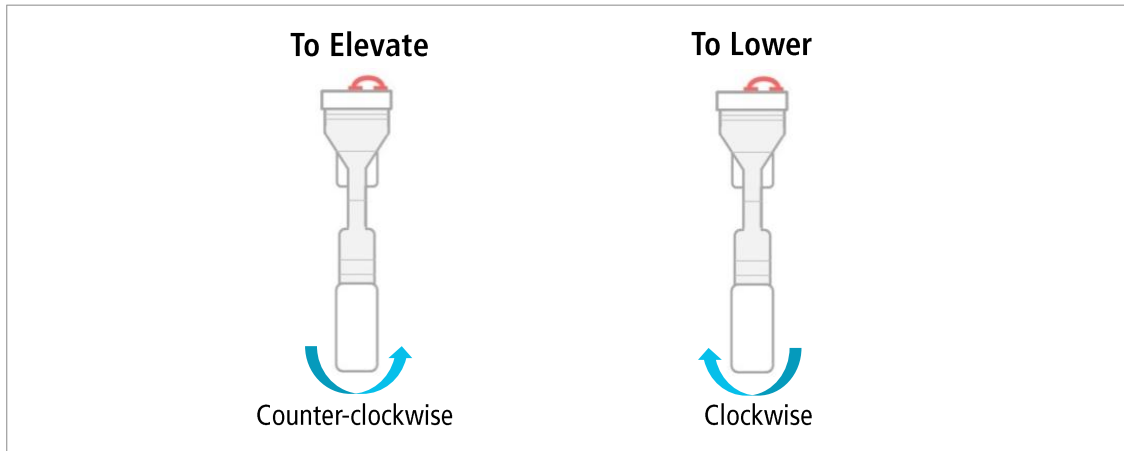
4. Purpose Of Centrifugation

The purpose of centrifugation is to situate Hematocrit below the slim neck.



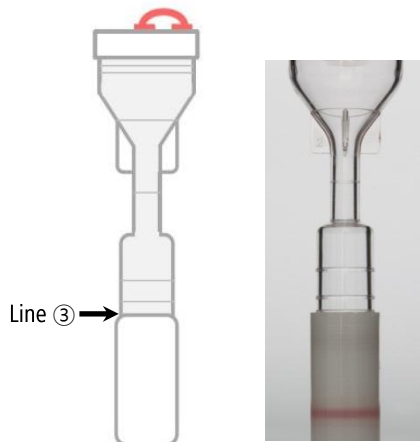
5. How to Use the Control Grip

1) How To Use Hand Control Grip



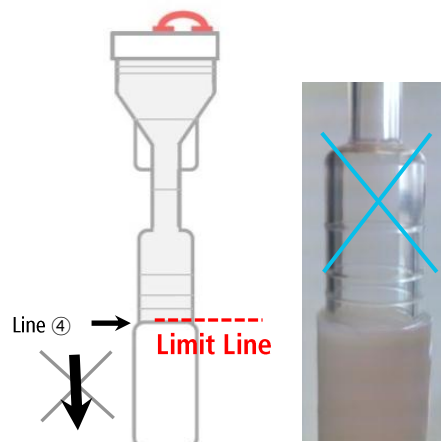
2) Start Position

Line ③ is the start position of the control grip when packed.



3) Limit Line of the Control Grip

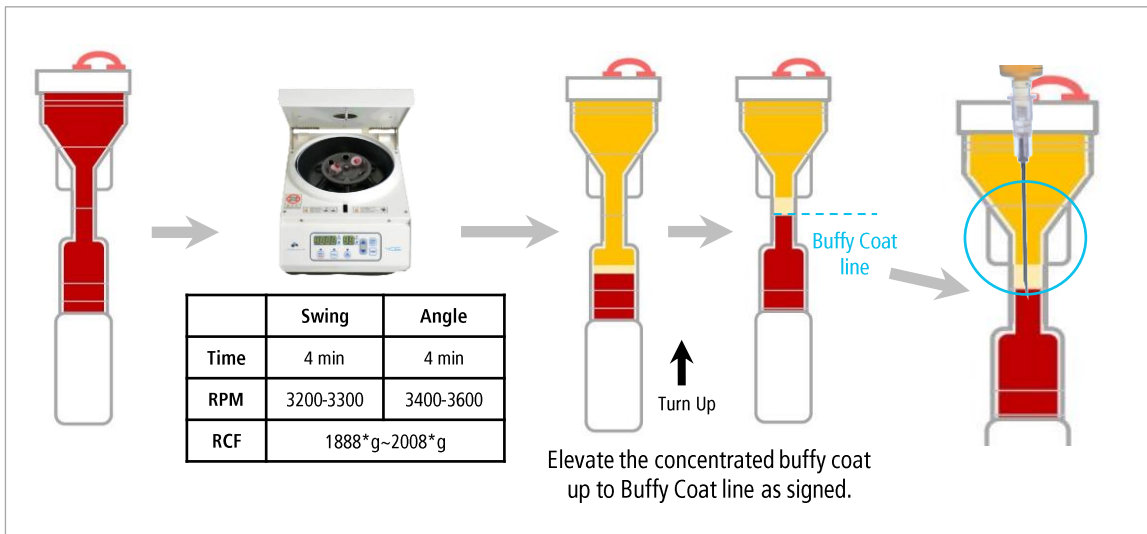
If the grip is turned down below Line ④, blood might leak during spins.



6. Centrifugation Cases

1) Standard Case – 1 Time Spin

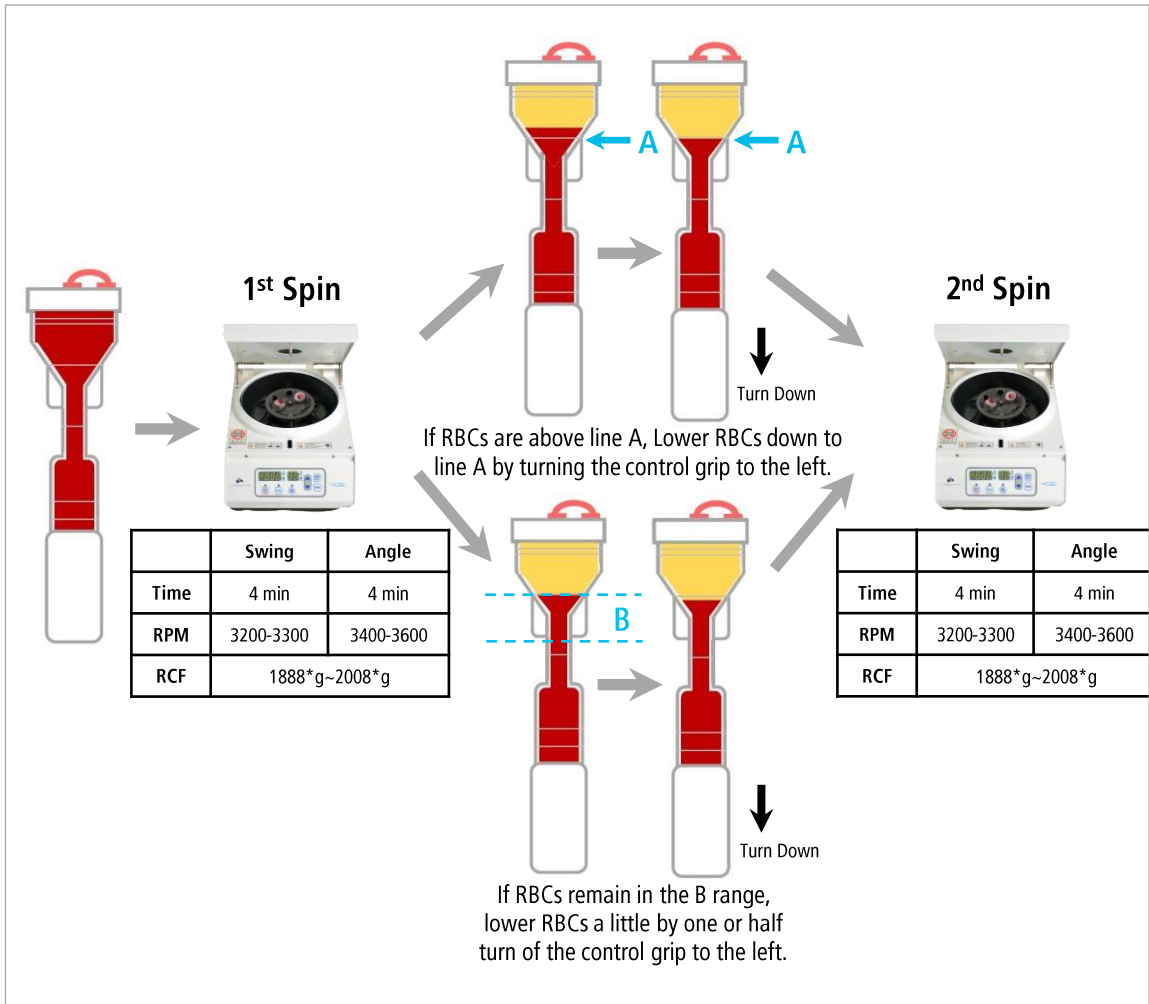
Case A – Clearly separated after the 1st spin



2) Non-standard Cases – 2 Time Spins

Case B – Elevated Hematocrit

- Case B happens when RBCs remain above the slim neck after the 1st spin.
- It's usually shown in male's blood.

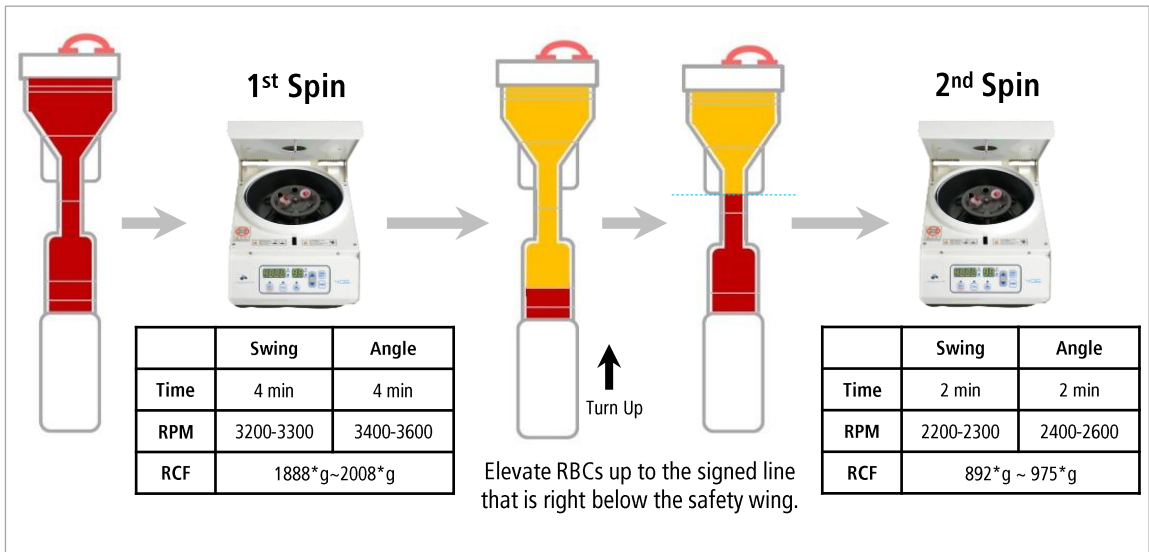


Q. What if RBCs are not lowered below the slim neck after 2 time spins?

➔ Take one more spin with the same speed and time.

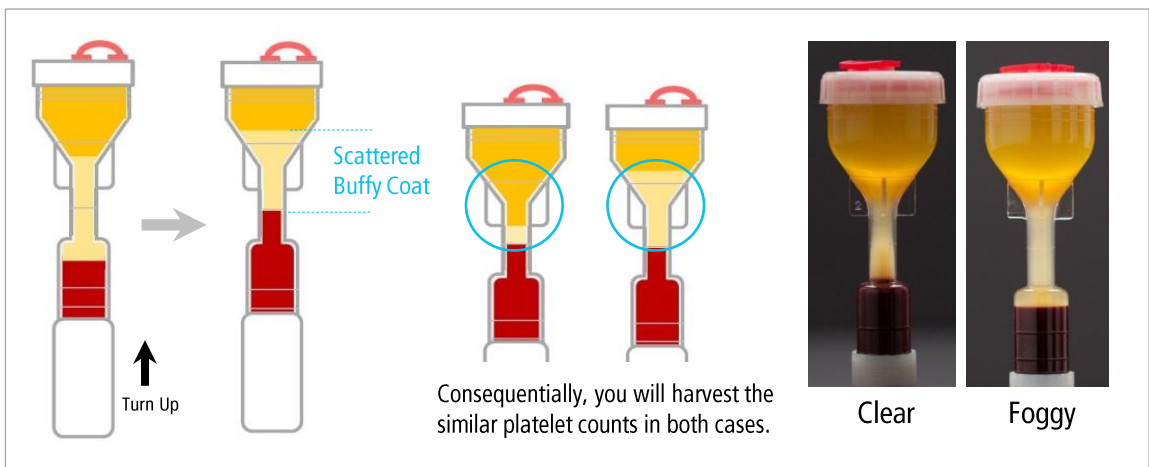
Case C – Depressed Hematocrit

Case C happens when RBCs are depressed lower than the slim neck after the 1st spin. It's usually shown in anemia patients' or female's blood.



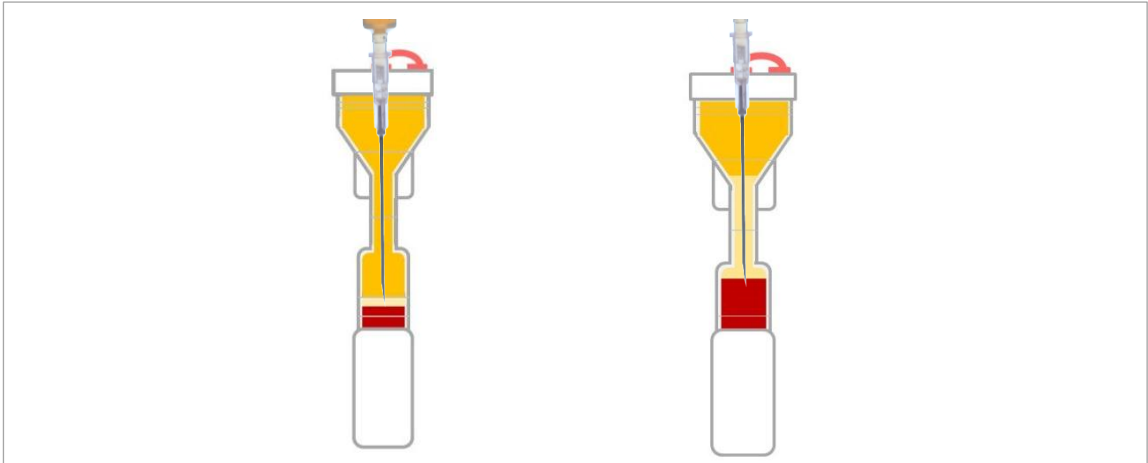
Case D – Buffy Coat is not concentrated clear after 2 time spins

Case D is a still good result even if you can't see clear buffy coat layer after spins. In this case, elevate buffy coat layer up to Buffy Coat Line and extract it.



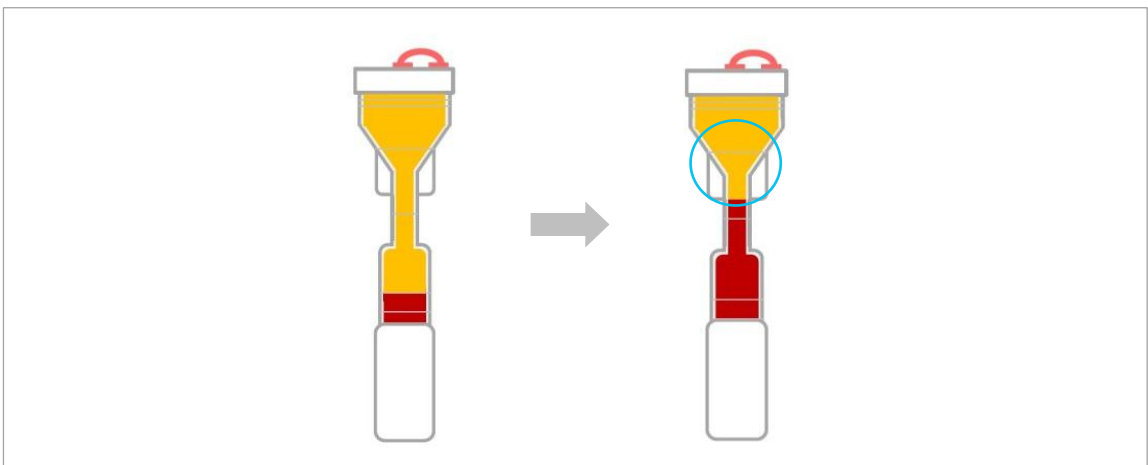
Case E – The control grip can't be turned up any more

Use a **long needle** to extract PRP if it's impossible to elevate buffy coat any more as the control grip has already been turned up to maximum.



Case F – No buffy coat seen

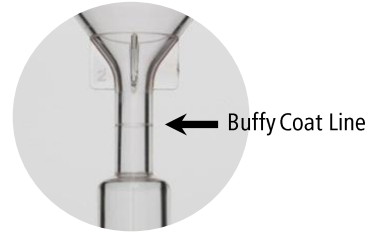
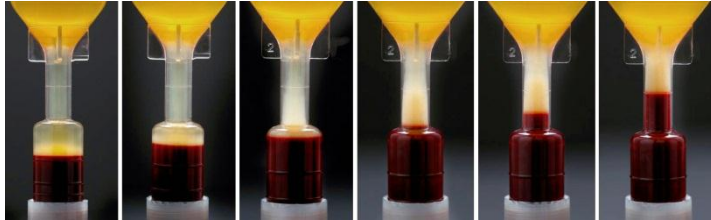
There are some patients who have few platelets. If you can't see any buffy coat at all after several spins, stop taking spins and just extract plasma part near RBCs.



V. PRP Extraction

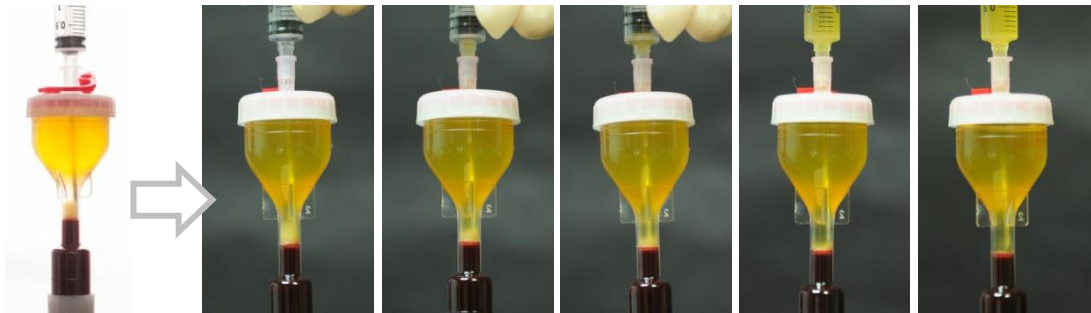
1. How To Extract PRP

1) Elevate buffy coat up to the Buffy Coat Line by turning right the control grip.



2) Prepare 3cc syringe / 18G $1\frac{1}{2}$ Needle for PRP extraction.

3) Draw 1.5~2ml PRP from the slim neck where Buffy Coat is concentrated, making Tornado inside the tube so that sunk platelets can be floated and drawn easily.

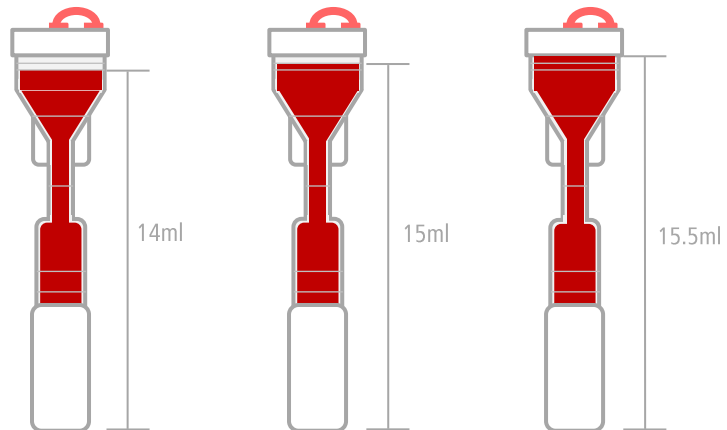


4) Draw the remaining PPP(platelet poor plasma) in 5cc syringe. PPP is used to spray on the entire face to relieve the stimulated skin.



3. PRP Volume for Enrichment Test

- 1/10 of the total blood sample volume is required for enrichment test.



Male

Female

Anemia

Blood Vol.	12.5 ml	13.5 ml	14 ml
Anticoagulant Vol.	1.5 ml	1.5 ml	1.5 ml
PRP Vol. PRP / Blood 1 / 10	1.25 ml	1.35 ml	1.4 ml

※ If You Use a Needle for Extraction,

Normally, about 0.05ml of buffy coat might remain clinging to the inside hole of the needle. Therefore, about 0.05ml loss of buffy coat should be considered when you count platelets in PRP, and deduct loss volume of 0.05ml from 1/10 of the total blood sample volume.

	Male	Female	Anemia
PRP	1.25 ml	1.35 ml	1.4 ml
Loss Vol.	- 0.05	- 0.05	- 0.05
PRP Test Vol.	1.2 ml	1.3 ml	1.35 ml