

3 Person Site Swap Workshop for Club Passers

Many jugglers are familiar with 2 handed site swap notation, which greatly expanded technical juggling some years ago. The mathematics for n handed site swap is straight forward and has been widely known for a long time, but outside of a few specialized groups, site swap for 3 or more club passers is not often seen in the juggling community. Here is an introduction to site swap for 3 person club passing patterns and a list of example patterns to try.

Introduction

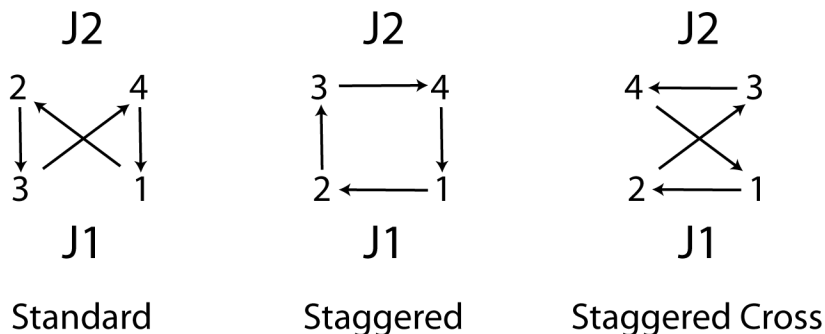
Site swap math doesn't care about the number of hands or the order in which they throw. Any valid site swap is valid for any number of hands. Some n handed site swaps are rather stupid and some are really hard to do, so a little experimentation may be required to find interesting variations.

This workshop will focus on asynchronous (or standard site swaps) where each hand throws in its order in a sequence. We won't discuss multiplex or synchronous site swaps, all of which work for n handed patterns as well as for 2 hands. Most club passers learn synchronous site swaps first (6 club 4 count, 3 count, etc.), so asynchronous site swaps may seem strange at first. There are also interesting combinations of asynchronous and synchronous site swaps awaiting more exploration in the future!

We'll start with 4 handed site swap for a review of the fundamentals and then work up to 6 handed site swap.

Review of 4 Handed Site Swap

To figure out where the throws go in a 4 handed site swap, first order the hands in a graph. Here are the 3 possibilities (plus their mirror images) for 4 handed site swap for two people facing each other. (Of course, the two people could also be side by side, or front to back, or whatever you please.)



The hands always throw in the order in which they are numbered: 1, 2, 3, 4. A site swap throw will follow as many arrows on the graph as the number of the site swap starting with its originating hand. That is a 4 will always go 4 places back to the same hand, and a 1 and 5 will always go to the next hand, 2 and 6 will always skip two places, etc.

Standard Site Swap Order

The relative heights of the throws depend more or less on the site swap number. The actual heights also vary based on speed of juggling, dwell time, etc. For the standard arrangement of 4 handed site swap and a typical juggling speed, the throws for J1 can be generalized as

follows.

Site Swap Number	Juggler J1 Throw	Height/Spin	Normalized Site Swap
0	Empty Hand	-	0
1	Cross Pass	Hand Across	0.5p
2	Cross Self	Zip (Self Hand Across)	1
3	Straight Pass	Hand Across	1.5p
4	Self Hold	Hold or Quick Single	2
5	Cross Pass	Zap or Joe (Half Spin Throw)	2.5p
6	Cross Self	Single	3
7	Straight Pass	Lofty Single	3.5p
8	Self Straight Up	Double (Hef)	4
9	Cross Pass	Lofty Double	4.5p
10	Cross Self	Triple	5
11	Straight Pass	Lofty Triple	5.5p
12	Self Straight Up	Quadruple	6

Note that sometimes site swap numbers of 10 and over are written alphabetically as A, B, C, D, etc. for 10, 11, 12, 13, etc.

In addition, sometimes site swap numbers are normalized by dividing by the number of jugglers so that the site swap numbers correspond more closely to their equivalents in solo juggling site swaps. For example, site swap 7 can be written as 3.5p (the p stands for pass). All passes in normalized site swap notation for a standard unstaggered sequence will be decimals while selves will be whole numbers. This is just a different way of writing the patterns and doesn't change the sequence or type of throws.

For slower site swaps (especially with lower numbers of clubs), 4s and 5s can be juggled as single spins rather than holds or half spins.

Juggler J2 has the same throws as A except that all straight passes are replaced by cross passes and all cross passes are replaced by straight passes.

For example, in the site swap 7 (also referred to as 7 club 1 count or 3.5p), J1 throws all straight passes from both left and right hands and J2 throws all cross passes from both left and right hands.

In standard site swaps the right and left hands of each juggler throw at regular intervals. The throw sequence for any site swap will be:

J1 right hand
 J2 right hand
 J1 left hand
 J2 left hand

The throws are spaced evenly.

Global Site Swap and Local Site Swap

Mathematically, site swap sequences correspond to the throws for all the hands in the pattern. This is known as the global site swap. Each individual juggler will only make some of the throws. The throws from the point of view of a specific juggler are known as the local site swap for that juggler.

For example in the 6 club site swap 7 5, juggler A throws a 7, then juggler B throws a 5, then juggler J1 throws a 7, then juggler J2 throws a 5, etc. The local site swap for J1 is 7. The local site swap for J2 is 5. This can be written together as 7 | 5.

(Side note: if you're actually going to try 7 5, I recommend throwing the 7s as doubles and the 5s as zaps to minimize collisions.)

In general for the standard 4 handed site swap, J1 will do every other sequence element and J2 the alternates. If there is an odd number of elements, then each juggler will eventually do all the numbers. For even numbers of elements, each juggler will only juggle half of the site swap numbers.

For example, in the site swap 6 4 5, juggler J1 has a local site swap of 6, then 5 and then (repeating from the beginning again) 4 or 6 5 4. Juggler J2 takes all the others, or 4 6 5.

Learning 4 Handed Site Swap Patterns

For beginners, start by learning 6 4 5 in the standard configuration. There are 5 clubs. Initially, throw the 5s as single passes. Once the pattern is comfortable, also learn the 5s as zaps (or half spin passes). Remember one juggler throws cross passes and one throws straight passes. The local site swap is 6 5 4, so the throw sequence for J1 will be:

Right hand self
Left hand cross pass
Right hand pause
Left hand self
Right hand cross pass
Left hand pause

Juggler J2 does the same with straight passes, starting with the hold (4).

Once the pattern is smooth, then try throwing the 5s as zaps instead of single passes. Once that is smooth, throw the holds (4s) as a quick single flip to the same hand for an interesting and attractive pattern that isn't too difficult.

More experienced passers can learn 7 5 6 6 6. The local site swaps are 7 6 6 5 6 for J1 and 5 6 7 6 6 for J2. To break it down:

J1 throws cross pass, self, self, straight zap, self
J2 throws (after a short pause) cross zap, self, straight pass, self, self

In the steady state, both jugglers throw a zap and a single pass to the same target hand each

cycle.

Advanced passers already know lots of 4 handed site swaps to practice, but if you need an example, try 96677. The local site swap is (of course) 96767.

See later on for a list of other example 4 handed site swaps.

The Start

For ground state site swaps the clubs will be distributed starting with the first hand and continuing around the graph until the clubs are all used up. The starting hand will always be juggler J1's first hand.

For excited state starts the clubs may be distributed differently, or you may need to skip or add passes. Some trial and error and experience will often allow you to figure out a way to set up the start (that's usually how I do it). Otherwise, while there is a mathematical process to determine valid starting positions, it might be easiest to let a computer do that for you, for example on the Prechac web site (see references).

All excited states can also be achieved via a passing sequence from the ground state. That's nice theoretically, but not always useful if you're trying to learn a brand new and possibly very difficult pattern.

Staggered Site Swap Order

For staggered site swaps, the left and right hands of a single juggler are next to each other in the throw sequence in syncopated fashion. For example:

J1 right hand
 J1 left hand
 J2 right hand
 J2 left hand

Juggler J1 has a distinct pause while Juggler J2 makes 2 throws in a row, and vice versa.

The left hands and right hands now have different throws for each site swap number.

Site Swap Number	Juggler Right Hand Throw	Juggler Left Hand Throw	Height/Spin	Normalized Site Swap
0	Empty Hand	Empty Hand	-	0
1	Cross Self	Straight Pass	Hand Across	0.5p
2	Cross Pass	Cross Pass	Zip	1
3	Straight Pass	Cross Self	Zap	1.5p
4	Self Hold	Self Hold	Hold	2
5	Cross Self	Straight Pass	Zap	2.5p
6	Cross Pass	Cross Pass	Single	3
7	Straight Pass	Cross Self	Lofty Single	3.5p

Site Swap Number	Juggler Right Hand Throw	Juggler Left Hand Throw	Height/Spin	Normalized Site Swap
8	Self Straight Up	Self Hold	Double	4
9	Cross Self	Straight Pass	Lofty Double	4.5p
10	Cross Pass	Cross Pass	Triple	5
11	Straight Pass	Cross Self	Lofty Triple	5.5p
12	Self Straight Up	Self Hold	Quadruple	6

Juggler J2's throws are the same as for J1.

For example, in the the site swap 7, both jugglers throw lofty single straight passes with the right hand and single crossing selves with the left hand. This is more commonly known as 7 club 2 count singles. The local site swap for each juggler will be 7 7 – where the – is a pause for 2 beats.

The mirror image of staggered site swaps just reverse all the right hand and left hand throws.

To blow your mind some more, try the site swap 6 4 5 in staggered sequence, starting with Juggler J1's right hand. Juggler J1 has the following local site swap: 6 4 – 4 5 – 5 6 –. That works out to:

Right hand cross single pass
 Left hand hold
 Pause
 Right hand hold
 Left hand straight zap pass
 Pause
 Right cross single self
 Left hand cross single pass
 Pause

Juggler J2 does the same thing, starting with the last part of the sequence, – 5 6 –.

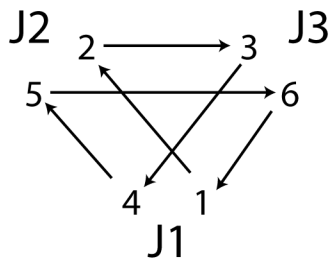
There are some interesting staggered site swap patterns (such as Will's Long Beach Popcorn, which is staggered B77797) and many other variations yet to explore.

A helpful note is that the 4 club solo double-singles pattern has a timing very close to 97 – in 4 handed site swap.

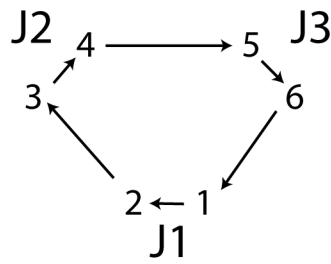
6 Handed Site Swap Fundamentals

Now we're ready to learn 6 handed site swaps.

We'll start by making graphs to show the order of the hands. For 6 hands there are many more possible hand sequences than for 4 hands. I will only show 2 possibilities.



Standard



Staggered

Those graphs show the throw sequences moving clockwise: J1 followed by J2 followed by J3. That's arbitrary. The graphs work exactly the same way if all the directions are reversed.

The standard graph has jugglers J1 and J3 starting with the right hand and juggler J2 starting with the left hand. This makes the throws consistent for all 3 jugglers. There are other ways of organizing the graph in which the site swap throws for each juggler is different.

Here is one way to generalize the throws for the standard site swap graph for 6 hands.

Site Swap Number	Throw Type	Throw To	Height/Spin	Normalized Site Swap
0	Empty Hand		-	0
1	Straight	Next	Hand Across	0.3p
2	Cross	Previous	Hand Across	0.7p
3	Cross Self	Self	Zip	1
4	Cross	Next	Hand Across	1.3p
5	Straight	Previous	Hand Across	1.7p
6	Hold or Flip Self	Self	Hold/Quick Single	2
7	Straight	Next	Zap	2.3p
8	Cross	Previous	Zap/Low Single	2.7p
9	Cross	Self	Single	3
10	Cross	Next	Lofty Single	3.3p
11	Straight	Previous	Single/Low Double	3.7p
12	Straight Self	Self	Double	4
13	Straight	Next	Lofty Double	4.3p
14	Cross	Previous	Low Triple	4.7p
15	Cross Self	Self	Triple	5

For J1, the next juggler is J2 and the previous juggler is J3.

Likewise, for J2, the next juggler is J3 and the previous juggler is J1 and for J3, the next juggler is J1 and the previous juggler is J2.

If the jugglers are organized in a clockwise fashion from above, then the Next juggler is always on the passer's left and the Previous juggler is on the passer's right.

Note that the order of throws for the standard sequence is always:

J1 Right Hand
J2 Left Hand
J3 Right Hand
J1 Left Hand
J2 Right Hand
J3 Left Hand

Juggler J2 always starts left handed.

To learn 6 handed site swap, first practice the site swap numbered throws by themselves. That can be more challenging than it might seem at first. Learn all the throws in one direction, and then learn them in the other direction.

Note that even numbered passes are always crosses (right to right and left to left) and odd numbered passes are straight (right to left and left to right).

Site swap 7 will be a 1 count triangle where all passes are straight throws to the left side of the triangle. All passes are straight: left to right and right to left. Start with all the throws as single spins (which will be quite slow). Once that is smooth, try throwing all the passes as zaps. You'll throw in a different direction than you're looking for incoming catches, which makes this pattern challenging for club passers first encountering cross-eyed patterns.

Site swap 8 will be a 1 count triangle where all the passes are crossing throws. First learn the throws to the left side of the triangle (the same as for 7). You can learn the throws to the right side afterwards. Practice with single spins at first.

For 8 and all the even numbered site swaps, all of the throws that start from a right hand stay in right hands and vice versa. This means that you can practice 8 (and 10 and 12) with just half of the clubs in the right hands first, then the other clubs in just left hands, and then finally put them all together.

Now site swap 9 by itself falls into the category of a stupid site swap, since it is just 3 people each juggling 3 clubs by themselves. For the purpose of learning site swap throws, though, practice site swap 9 synchronous, which is where all the passes are straight throws to the left and all 3 jugglers have their right hands in sync and their left syncs in sync.

Site swap 10 is once again a 1 count triangle where all the passes are crossing throws to the left. Throw lofty singles to spread out the timing.

Site swap 11 is a 1 count triangle with double straight throws or single straight throws if you want to juggler faster.

Site swap 12 is in the same category as 9. By default it is just 3 people juggling 4 clubs each

in a fountain. 12 synchronous is a worthy challenge, though. That would be a 1 count triangle with all passes as crossing doubles to the left. Everyone throws in sync. It's not easy.

And so on.

Beginners should focus on 7 and 8.

Intermediate jugglers can practice 9 and 10.

Advanced jugglers can attempt 11 or 12 or whatever number suffices to be a challenge.

3 Juggler Site Swaps

Here are more interesting 3 person site swaps.

To begin, try 9 6 8 9. Throw the 9s as slow self singles, the 8 as a quick single pass, and the 6 as a hold. Because the sequence has an even numbered length of 4 this pattern has a right handed version and a left handed version. Most jugglers will be most comfortable starting with the right handed version. The local site swap is 9 9 8 6.

Right self
Left self
Right crossing pass to the previous juggler in triangle (to the right for a clockwise ordered triangle)
Hold

The first juggler (J1) starts with 3 clubs (2 in the right hand) and the two selves. The second juggler (J2) starts with 2 clubs and with a left hand hold, followed by the right and left selves. The third juggler (J3) starts with 3 clubs (2 in the right hand) and a right hand crossing pass to Juggler J1.

The timing of the throws should be even and smooth. This is a fun site swap pattern that isn't too difficult to learn.

Once this pattern is running smoothly, change the 6s from a hold to a quick single spin flip to the same hand. This will even out the throw timing for all the hands and looks great.

The next step is to balance the pattern out by making it right handed and left handed. The site swap will be 9 9 6 8 8 (which is the same as the previous except we added one more 8). This is a 5 count pattern with 2 throws out of every 5 beats. The local site swap is 9 8 9 8 6.

Right self – Juggler J1 starts here
Left crossing pass to the previous juggler (to the right)
Right self
Left crossing pass to the previous juggler (to the right)
Right hold or quick single flip – Juggler J3 starts here

Repeat with right and left hands switched

Left self
Right crossing pass to the previous juggler (to the right)

Left self – Juggler J2 starts here
Right crossing pass to the previous juggler (to the right)
Left hold or quick single flip

Juggler J1 starts with 3 clubs and the first right hand self. Juggler J2 starts halfway through the second set with 3 clubs and a left hand self, crossing pass to the previous juggler (to the right), then hold. Juggler J3 starts with 2 clubs at the first right hand hold.

As before, start with the 6s as holds and then once the pattern is comfortable, change them to a quick single flip.

More experienced club passers can try 10 8 9 9 9 with 9 clubs total. The local site swap is every 3rd element, or 10 9 8 9 9. That is, there are 2 passes out of every 5 throws.

Lofty single crossing pass to the next juggler (to the left)
Self
Crossing zap to the previous juggler (to the right)
Self
Self

One useful tip is to wait to throw the zap until the incoming pass is part of the way across. Don't throw the zaps too low.

Another more advanced site swap pattern is 12 9 9 10 10. The local site swap is 12 10 9 10 9. This is a 10 club pattern.

Self straight up double (Hef)
Lofty single crossing pass to the next juggler (to the left)
Self
Lofty single crossing pass to the next juggler (to the left)
Self

10 Club Site Swaps

The n count 10 club triangle site swaps are definitely worth exploring for more experienced club passers. For all of these patterns the global and local site swaps are the same. Odd counts have crossing throws while even counts have straight throws. All throws can be made in the same direction if you want (it will just change the start order).

1 count – Site swap 10. As described above, it's just 1-count single throws to the next juggler in the triangle.

2 count – Site swap 11 9. Throw right handed lofty inside triangle single throws and left handed selves. The passes should be a little deep and outside to avoid collisions.

3 count – Site swap synchronous 12p 9 9. This is a synchronous pattern, so all the jugglers throw rights and lefts at the same time, all starting with 2 clubs in the right hand. All the passes are crossing doubles to the left side of the triangle.

4 count – Site swap 13 9 9 9. Throw the 13 as a lofty inside triangle double.

5 count – Site swap 14 9 9 9 9. Throw the 14 as a crossing triple. There is plenty of time in

this pattern.

6 count – Site swap synchronous 15p 9 9 9 9. This is a synchronous pattern, so all the jugglers throw rights and lefts at the same time, all starting with 2 in the right hand. The pass is a right to left straight triple.

11 Club Site Swaps

The n count 11 club triangle site swaps are also fun for those who like passing patterns with extra clubs. For all of these patterns the global and local site swaps are the same. All the patterns have straight passes only. All throws can be made in the same direction (it will just change the start order).

Most of these patterns are excited state, so they'll need to be started with either a different pattern or with a different number of clubs in the initial hands. What I find easiest is to have one juggler start with all the extra clubs (5, in this case), and throw the passes at approximately the right timing (3 count, 4 count, etc.) without selves for the first two passes. Then the other jugglers begin with the pass when forced.

1 count – Site swap 11. As described above, it's just fast 1 count single throws to the next juggler in the triangle. It can also be done with double throws.

2 count – Site swap 13 9. Throw right handed lofty inside triangle double throws and left handed selves. The passes should be a little deep and outside to avoid collisions.

3 count – Site swap synchronous 15p 9 9. This is a synchronous pattern, so all the jugglers throw rights and lefts at the same time. All the passes are straight triples to the left side of the triangle.

4 count – Site swap 17 9 9 9. Throw the 17 as a lofty inside triangle triple.

5 count – Site swap 19 9 9 9 9. Throw the 19 as a straight quad.

6 count – Site swap synchronous 21p 9 9 9 9 9. This is a synchronous pattern, so all the jugglers throw rights and lefts at the same time. The pass is a right to left straight lofty quad.

Jugglers who enjoy right handed patterns and higher numbers may also want to explore 15 9 11 9 (fast popcorn triangle). As with some of the 10 club patterns, some of the right handed patterns are easier if you reverse the direction of the triangle so that the right hand throws are inside passes in the triangle instead of outside passes.

As with all juggling, practice helps make these unusual passes easier.

Good luck and happy site swap passing!

4 Handed Site Swap Examples

Here are a few asynchronous site swaps excerpted from my passing notebook and scraps of notes lying around from all over.

3 Person Site Swaps for Club Passers – Luke Emery 3/22/10

Global	Local	Normalized	Notes
5 Clubs			
645	654	3 2.5p 2	
942	924	4.5p 2 1	
672	627	3 1 3.5p	
6 Clubs			
75	7 5	3.5p 2.5p	6 club async 1 count, throw 7s as doubles and 5s as zaps
756	765	3.5p 3 2.5p	Zap Opus 1
75666	76656	3.5p 3 3 2.5p 3	
972	927	4.5p 1 3.5p	From Daniel
77862	78276	3.5p 4 1 3.5p 3	Why Not
855	855	4 2.5p 2.5p	
85566	85656	4 2.5p 3 2.5p 3	
777726	772 776	3.5p 3.5p 1 3.5p 3.5p 3	From Daniel and Doreen
778626	782 766	3.5p 4 1 3.5p 3 3	From Daniel and Doreen
7 Clubs			
966	966	4.5p 3 3	7 club 3 count
96677	96767	4.5p 3 3.5p 3 3.5p	
9667777	9677677	4.5p 3.5p 3.5p 3 3.5p 3.5p	7s are magic
966777777	967776777	4.5p 3 3.5p 3.5p 3.5p 3 3.5p 3.5p 3.5p	9 is magic. From Bekka.
867	876	4 3.5p 3	French 3 count
86777	87767	4 3.5p 3.5 3 3.5p	
A6667	A6766	5 3 3.5p 3 3	5 count popcorn
86867	88766	4 4 3.5p 3 3	5 count popcorn with Hefs
A666966	A696666	5 3 4.5p 3 3 3 3	7 count popcorn
A666966966	A6966 66696	5 3 4.5p 3 3 3 3 3 4.5p 3	5 count lop sided popcorn
A666867	A687666	5 3 4 3.5p 3 3 3	
9966998626	96982 96966	4.5p 3 4.5p 4 1 4.5p 3 4.5p 3 3	7 club Why Not?
885	858	4 2.5p 4	Tricky...
8677777	8777377	4 3.5p 3.5p 3.5p 3 3.5p 3.5p	7s are magic
8686777	8877667	4 4 3.5p 3.5p 3 3 3.5p	7s are magic
8678677	8767687	4 3.5p 3 3.5p 3 4 3.5p	7s are magic
8686867	8887666	4 4 4 3.5p 3 3 3	7s are magic

Global	Local	Normalized	Notes
9A2	92A	4.5p 1 5	
9966998626	96982 96966	4.5p 3 4.5p 4 1 4.5p 3 4.5p 3 3	From Daniel and Doreen
8 Clubs			
6789A	68A79	3 4 5 3.5p 4.5p	
996	969	4.5p 3 4.5p	Double 3 count
978	987	4.5p 4 3.5p	
9 Clubs			
B88	B88	5.5p 4 4	3 count
6789A	68A79	3 4 5 3.5p 4.5p	

Staggered 4 Hand Site Swaps

While any 4 hand site swap can be juggled in a staggered pattern, the following patterns fit quite comfortably in that arrangement. Many have only right handed only passes.

Global	Local	Notes
5 Clubs		
645	64 - 45 - 56 -	
571737	57 - 37 - 17 -	3 is a straight zap, 1 is a left to right zip that is immediately rethrown as a left self
6 Clubs		
7773	77 - 73 -	7 club 2 count on one side only
771777		
773757	77 - 57 - 37 -	3 is a quick straight zap pass
973777175757	97 - 77 - 57 - 37 - 17 - 57 -	Half 7 club low popcorn, half 5 club extra wimpy popcorn
7 Clubs		
975777	97 - 77 - 57 -	Low Popcorn. Jugglers often throw the 5 (right to left self) as a single, but also try as a flat self
797577	79 - 77 - 75 -	Same as low popcorn but rotated one site to make a completely different 1 count passing pattern
B75797377777	B7 - 97 - 77 - 57 - 37 - 77 -	Long Beach / Extra Wimpy Popcorn
973797	97 - 97 - 37 -	
8 Clubs		
B77797	B7 - 97 - 77 -	Long Beach Popcorn in staggered site

Global	Local	Notes
		swap
D777B7579797	D7 – B7 – 97 77 – 57 – 97 –	Super/Wimpy Popcorn in staggered site swap
B757B7	B7 – B7 – 57 –	Pass Pass Self
9 Clubs		
D797B7	D7 – B7 – 97 –	Super Popcorn

6 Handed Site Swap Examples

Global	Local	Normalized	Notes
7 Clubs			
9 7 5 7	9 7 5 7	3 2.3p 1.7p 2.3p	Throw 9s as doubles, 7s as singles, 5s as zaps – also try in staggered pattern
9 7 5 7 7	9 7 7 7 5	3 2.3p 2.3p 2.3p	
9 6 6 7	9 7 6 6	3 2.3p 2 2	Try 9s as doubles, 6s as quick single flips to same hand, 7s as singles
8 Clubs			
9 9 6 8	9 8 6 9	3 2.7p 2 3	8 is magic, try right handed. Throws 8s as singles.
9 9 6 8 8	9 8 9 8 6	3 2.7p 3 2.7p 2	Throw 8s as singles.
10 7 7 8	10 8 7 7	3.3p 2.7p 2.3p 2.3p	8 is magic
12 8 8 3 9	12 3 8 9 8	4 1 2.7p 3 2.7p	Why Not Triangle from Cristoph
9 Clubs			
11 9 7 9	11 9 7 9	3.7p 3 2.3p 3	Try reversing triangle
11 9 7 9 9	11 9 9 9 7	3.7p 3 3 3 2.3p	
10 8	10 8	3.3p 2.7p	Color code 10s and 8s
10 8 9 9 9	10 9 8 9 9	3.3p 3 2.7p 3 3	10 is magic; use unique color
11 8 8 9	11 9 8 8	3.7p 3 2.7p 2.7p	
11 8 8 9 9	11 9 8 9 8	3.7p 3 2.7p 3 2.7p	
10 11 12 3 9	10 3 11 9 12	3.3p 1 3.7p 3 4	Pentagramm or Pentameter from Bernarnd, Evi & Cristoph
10 Clubs			
10	10	3.3p	1 count extra club triangle
11 9	11 9	3.7p 3	2 count extra club triangle

3 Person Site Swaps for Club Passers – Luke Emery 3/22/10

Global	Local	Normalized	Notes
12p 9 9	12p 9 9	4p 3 3	3 count extra club triangle SYNCHRONOUS
13 9 9 9	13 9 9 9	4.3p 3 3 3	4 count extra club triangle
14 9 9 9 9	14 9 9 9 9	4.7p 3 3 3 3	5 count extra club triangle
15p 9 9 9 9 9	15p 9 9 9 9 9	5p 3 3 3 3 3	6 count extra club triangle SYNCHRONOUS
12 9 9 10 10	12 10 9 10 9	4 3.3p 3 3.3p 3	10s are magic
12 9 9 11 9	12 11 9 9 9	4 3.7p 3 3 3	Throw 11 as single
13 9 9 9 10	13 9 9 10 9	4.3p 3 3 3.3p 3	10s are magic
11 9 10 10	11 10 10 9	3.7p 3.3p 3.3p 3	
11 9 10 10 10	11 10 9 10 10	3.7p 3.3p 3 3.3p 3.3p	10s are magic
14 9 9 9 9 10 10	14 9 10 9 10 9 9	4.7p 3 3.3p 3 3.3p 3 3	
11 Clubs			
11	11	3.7p	1 count 2 extra club triangle
13 9	13 9	4.3p 3	2 count 2 extra club triangle. Excited state start.
15p 9 9	15p 9 9	5p 3 3	3 count 2 extra club triangle. SYNCHRONOUS. Excited state
17 9 9 9	17 9 9 9	5.7p 3 3 3	4 count 2 extra club triangle. Excited state, so try start with one juggler having 5 clubs and throwing two evenly spaced right hand triples until the pattern gets going.
19 9 9 9 9 9	19 9 9 9 9	6.3 3 3 3 3 3	5 count 2 extra club triangle.
21 9 9 9 9 9	21 9 9 9 9 9	7p 3 3 3 3 3 3	6 count 2 extra club triangle. SYNCHRONOUS.
15 9 11 9	15 9 11 9	5 3 3.7p 3	Throw 15s as triple selves and 11s as single passes
15 11 9 11 9	15 11 11 9 9	5 3.7p 3.7p 3 3	Chocolate Bar. Throw 15s as triple selves and 11s as single passes
15 11 9 11 9 11 11	15 11 11 9 11 11 9	5 3.7p 3.7p 3 3.7p 3.7p 3	
12 12 9 11 11	12 11 12 11 9	4 3.7p 4 3.7p 3	From Cristoph

Other Resources

Site Swap Calculator <http://www.twjc.co.uk/calculator.html>

Prechac Passing Site Swap Generator <http://www.prechacthis.org>

Gandini Juggling <http://www.gandinijuggling.com>

Madison Area Juggler web site <http://www.madjugglers.com>