

# THE COMPARISON OF FEMALE PRETEEN PANTS PATTERNS IN DIFFERENT METHODS

## FARKLI METOTLARDAKİ ÖN ERGEN KIZ PANTOLON KALIPLARININ KARŞILAŞTIRILMASI

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### ABSTRACT

The goal of the research is to compare female preteen pants patterns in different methods. Three methods System Müller & Sohn (M I), Winifred Aldrich (M II) and Natalie Bray (M III) are examined in the research in which exemplification way is used. The comparisons are made with three different basic pants patterns which were prepared for a 152-sized Turkish girl. Compared to the body measurement, the body rise in M I and waist to knee in M II and M III are found much more. M I does not provide the essential additions for hips. It is determined that back grain line slides towards side seam between waist and hips in M III.  $\Sigma$ CD in M I is shorter than the others.  $\Sigma$ CW in M II is near to the each other. It is proved at the end that M II has got more necessary qualifications when compared with the others.

**Key Words:** Child pants pattern, Pattern preparation, Children clothing, Pattern comparing, Pattern control

### ÖZET

Bu araştırmanın amacı, farklı metotlarda hazırlanan ön ergen kız çocuğu temel pantolon kalıplarının karşılaştırılmasıdır. Örnek olay yönteminin kullanıldığı çalışmada, üç farklı metot incelenmiştir. Bu metotlar; System Müller & Sohn (M I), Winifred Aldrich (M II) ve Natalie Bray (M III) metotlarıdır. Kalıp karşılaştırmaları, 152 beden Türk kız çocuğu ölçülerinde hazırlanan 3 farklı temel pantolon kalıbı üzerinde yapılmıştır. Vücut ölçüsü ile karşılaştırıldığında; M I de kalça düşüklüğü, M II ve M III de diz yüksekliği fazla bulunmuştur. Kalça için gerekli ilaveleri M I karşılamamaktadır. Arka ütü hattının M III de bel ile diz arasında yan dikişe doğru kaydığı tespit edilmiştir. M I deki  $\Sigma$ AY değerlerine oranla kısa, M II deki  $\Sigma$ AG değerlerine oranla daha fazladır. Metotlar arası karşılaştırmalarda vücut derinliği en geniş M III de, en dar M I dedir. Araştırma sonucunda M II nin diğerlerine oranla ölçülen kriterleri daha fazla karşıladığı tespit edilmiştir.

**Anahtar Kelimeler:** Çocuk pantolon kalıbı, Kalıp hazırlama, Çocuk giyimi, Kalıp karşılaştırma, Kalıp kontrolü

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### 1. INTRODUCTION

The analytical reports on the sector of ready-made clothing show that the children clothing market is growing quickly in European countries, including Turkey, and in America, and that this growth will continue (1-4). The main target mass of the children clothing producers has been the young children that are called "preteen".

The word "preteen" describes a child slightly younger than a teenager who is possibly between the ages of about 8 and 12. The word "tween" has the same meaning. This word comes from the age being *between* that of a child

and a teenager or an adolescent. During this period of life, most children go through the physical stages of puberty, which often begin before a person has reached the age of 13 (5). Cooklin (1991) has named this period "prepubertal" and considers it between the ages 10 and 13 (6). The term "preteen" is used in this research.

The physical development starts earlier for the preteen girls compared to boys (6,7). Physical development refers to the growth and changes of the preteen's body. During this growth stage, the body might appear out of proportion. Taking the physical

changes into account, it could affect the fit of her clothes. Ranges for children may no longer fit her while the sizes and proportions of adult ranges are not also suitable for her changing body (7).

The clothes of the preteens mostly aim at comfort for it would usually be worn out of school uniform. Among these clothes which are called "the casuals", the pants have a significant place. Proportional changes impact the fit of pants (8). For instance, in study of young women, La Bat and De Long (1990) found that their subjects expressed the most dissatisfaction with

lower body fit at the waist, hip and thighs and were the least satisfactory with the fit of pants compared to all the other apparel products (9). Clothes for this age range must be flexible, so that they can camouflage awkward proportions and emphasize the positive aspect of each stage of growth (10).

In terms of children clothing, there are a variety of researches made in the areas such as consumer socialization, approach to product qualities, learning the product symbols, affecting the decisions of the family to buy, addiction to brands, cloth conformity and creating measure standards. However, there has been no research on the comparison of cloth patterns yet.

It has been observed that the physical growth, the consciousness of fashion (10,11) and the attitude to buy develop earlier for the preteen girls, compared to the boys of their age (12,13,14,15). It is the group of preteen girls who face the cloth fit problems first owing to these matters. In this research, the aim is -with certain measurements- to compare the pants patterns prepared for preteen girls with different methods. Thanks to the results, new proposals that can be helpful when preparing pants patterns are given to children clothing producers.

## 2. METHOD

In the research in which exemplification way is used three different methods of children cloth patterns. The methods are named System Müller&Sohn Academy's M I (16), Winifred Aldrich's M II (17) and Natalie Bray's M III (18) according to their producers.

Three different patterns of 1/1 proportions are prepared for three methods. In the patterns, the 152-sized Turkish girl table values prepared by Erdoğan (1999) are referred (19). The measurements reflect the body characteristics of preteen period. A common measurement value for the methods' own standard table values could not be set. Therefore, the same measurements are used for three methods so that the control inconsistent of the research is managed. The comparisons

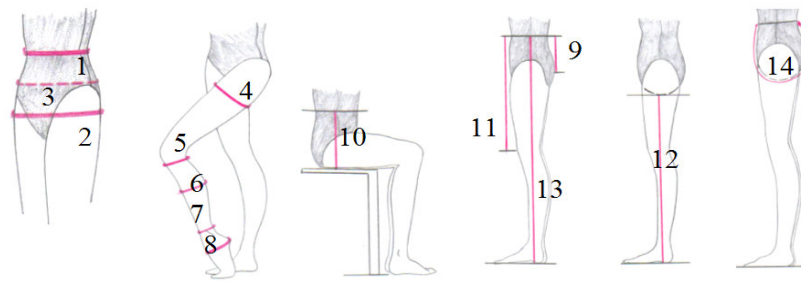


Figure 1. Essential measurements for pants and measurement forms

do not include the method measurements, but the usage characteristics in basic pants patterns and study of pattern forms.

The essential common measurements and the ways to take measurements so as to prepare pants pattern in research methods are given in Figure 1. 1, 2, 5, 8, 9, 10, 11, 12, 13, 14 numbered measurements are used for basic pants patterns. The others are essential for model pants for practice.

**The criteria for pants pattern preparing:** According to the experiences of pattern makers; technically the horizontal, vertical and curved lines of pants must fit to the body measurements. At first, the measurements of waist and hips must in a comfortable way to move. Front and back grain lines, side and inward seams must be in the middle of the leg and in vertical position (17, 18, 19, 20). The crutch

depth of the pattern must be prepared equal to the body measurements or 1-2 cm longer (21). The total crutch depth and depth control of the pattern must be measured equally to the body measurements whose ease addition is given (figure 1/14, figure 6/Z). Darts must stand usually parallel with the horizontal seam in the middle of waist.

**The criteria:** The patterns are compared regarding to;

1. The usage of measurements in the horizontal, vertical and curved lines drawings and ease additions,
2. The formulas used in defining vertical lines such as grain line and seams and the patterns of these lines,
3. The position of waist darts,
4. Control measurements' harmony with body measurements (figure 1/14, figure 6/Z),

Table 1. Comparison of Usage of Measurements according to Methods

		Measurements Usage			with Formula			with Measurement		
		No	Code	Description	M I	M II	M III	M I	M II	M III
Horizontal Measurements	1	B W	Waist				✓	✓	✓	
	2	H	Hips				✓	✓	✓	
	3	HH	High Hip				✓	✓	✓	
	5	K	Knee	-	✓				✓	
	8	A	Ankle				✓	✓	✓	
	-	CW	Crutch width		✓	✓	✓			
Vertical Measurements	9	BR	Body Rise	✓				✓	✓	
	10	CD	Crutch depth				✓	✓	✓	
	11	K	Waist to Knee	✓	✓	✓				
	12	CAI	Crutch to Ankle inseam	✓	✓	✓				
	13	PL	Pants Length				✓	✓	✓	
	14	CD	Crutch Depth				✓	✓	✓	
Lines	-	FGL	Front Grain Line	✓	✓	✓				
	-	BGL	Back Grain Line	✓	✓	✓				
Number of measurements	Total			6	6	5	5	6	7	

**Table 2.** Comparison of ease according to methods

Ease		Methods					
Code	Description	M I		M II		M III	
		Formula	Value	Formula	Value	Formula	Value
W	Waist	W+2cm	77 cm	W+1 cm	76 cm	W+2cm	77 cm
H	Hip	H	86 cm	H+2,5cm	88,5cm	H+4cm	90 cm

**Table 3.** Comparison of width measurements' formulas considering methods

Width		Methods					
Code	Description	M I		M II		M III	
		Formula	Value	Formula	Value	Formula	Value
F W	Front Waist	$\frac{1}{4}$ of W +0-0,5cm	19,25cm	$\frac{1}{4}$ of W + 0,25 cm	19 cm	$\frac{1}{4}$ of W + 0,5 cm	19,25cm
B W	Back Waist	$\frac{1}{4}$ of W +0-0,5cm	19,25cm	$\frac{1}{4}$ of W + 0,25 cm	19 cm	$\frac{1}{4}$ of W + 0,5 cm	19,25cm
$\frac{1}{2}$ W	$\frac{1}{2}$ Waist	$\frac{1}{2}$ of W+1cm	<b>38,5cm</b>	$\frac{1}{2}$ of W+0,5 cm	<b>38cm</b>	$\frac{1}{2}$ of W+1cm	<b>38,5cm</b>
FH	Front Hips	$\frac{1}{4}$ of H -1cm	20,5cm	$\frac{1}{4}$ of H + 1 cm	22,5cm	$\frac{1}{8}$ of H+2cm	22,5cm
B H	Back Hips	$\frac{1}{4}$ of H +1cm	22,5cm	$\frac{1}{4}$ of H +0, 25 cm	21.75cm	$\frac{1}{8}$ of H+2cm	22,5cm
$\frac{1}{2}$ H	$\frac{1}{2}$ Hips	$\frac{1}{2}$ H	<b>43 cm</b>	$\frac{1}{2}$ H+1,25cm	<b>44,25cm</b>	$\frac{1}{2}$ H+ 2cm	<b>45cm</b>
FCW	Front Crutch Width	$\frac{1}{20}$ of H + 0,5-1 cm	4,8cm	$\frac{1}{16}$ of H + 0,5 cm	5,8cm	$\frac{1}{10}$ of H-5cm	4 cm
BCW	Back Crutch Width	Carriage of the space between SS-BL from grain line towards right	9,5 cm	FCW+1/2 FCW	8,7cm	$\frac{3}{4}$ of H-5cm from Front Crutch to left	10 cm
$\Sigma$ CW	Total Crutch Width		14,3cm		14,5cm		14 cm
FKW	Front Knee Width	The total amount of BW- H	20cm	FBW+2cm	22cm	$\frac{1}{4}$ of KW	23cm
BKW	Back Knee Width	FKW+4cm	24cm	FKW+2cm	24cm	$\frac{1}{4}$ of KW	23cm
$\Sigma$ KW	Total Knee Width		44cm		46cm		46cm
FBW	Front Bottom Width	$\frac{1}{2}$ of BW-2cm	19cm	$\frac{1}{2}$ of BW -1cm	20cm	$\frac{1}{2}$ of BW	21cm
BBW	Back Bottom Width	F BW+4cm	23cm	FBW +2cm	22cm	$\frac{1}{2}$ of BW	21cm
$\Sigma$ BW	Total Bottom Width		42cm		42cm		42cm

### 3. RESULT AND DISCUSSION

**3.1. a) The comparison of measurement patterns:** The essential measurements when preparing preteen girl pants patterns are used in two types: a) Calculation with formula, b) Carriage of the body measurement to the pattern. The measurement usages are given in Table 1. accordingly, usage of knee and body rise measurements has differences according to methods. Knee measurement is not used in M I and body rise measurement is found with formula.

**3.1. b) The comparison of additional ease cuts:** Additional ease values of width measurements of patterns are given in Table 2.

The pants patterns' waist measurements in the three methods are drawn with an ease addition of an average of 2 cm, and M I and M II's body rise measurements

are drawn with an ease addition of 2,5-4 cm. Ease additions are common in patterns. Because a pants prepared with inelastic fabric must have an ease to provide the thickness of underclothes and t-shirts which will be underdressed. This quality can only be provided with additional eases which will be given to waist and hips. According to pattern makers, the general thought is the additional ease between 2 and 4 cm to waist and hips (17, 18, 19). However, the additional ease is not given to the hips of M I. Whereas M II and M III provide the essential additions for hips, M I does not.

**3.1. c) The comparison of width measurements:** The essential width measurements and formulas to prepare patterns are given in Table 3.

According to Table 3; except for hips measurements of M I, in the other three methods, waist and hips measurements provide the expected meas-

urements. Although the total crutch width is calculated with different formulas, it results in near numbers in all of the three methods. In proportion to the other two methods, knee is narrow in M I. It is equal in M II and M III. The bottom width is the same in all three methods.

**3.1. d) The comparison of length measurements:** The essential length measurements and formulas to prepare patterns are given in Table 4.

The body rise, which was found with formula in M I, is found with the usage of measurement taken from the body in the other two methods. The body rise is found 1,2 cm more than body measurements in M I. It is an expected result on account of its providing comfortable moving in basic pants pattern. This measurement is equal in M II and M III body measurement.

**Table 4.** Comparison of length measurements' formulas considering methods

Length Code	Methods						Body measu rement
	M I		M II		M III		
	Formula	Value	Formula	Value	Formula	Value	
BR	above CD 1/20 of K+3cm	17,2cm	below W body measurement	16cm	below W body measurement	16cm	16 cm
CD (above W )	Body measurement	24cm	Body measurement	24cm	Body measurement	24cm	24 cm
KL (above CD)	½ of IS -1/10 IS	28,2cm	½ of between CD and PL-3,5cm	31,75c m	½ of between CD and PL -5cm	30,25cm	KL- CD= 28,5cm
KL ( above W )		52.2cm		55,75c m		54,25cm	52,5cm
IS	PL - CD	71cm	PL - CD	71cm	PL - CD	71cm	71cm
PL (above W)	Body measurement	95cm	Body measurement	95cm	Body measurement	95cm	95cm

**Table 5.** Comparison of vertical lines according to methods

Lines		Methots					
Code	Description	M I		M II		M III	
		Formula	Value	Formula	Value	Formula	Value
FP	Front Pants	FH +FCW	25,3cm	FH +FCW	28 cm	FH +FCW	26,5cm
FGL	Front Grain Line	½ of FP	12,65cm	½ of FP	14,15cm	½ of FP	13,25cm
BP	Back Pants	BH+BCW	32 cm	BH+BCW	30,4cm	BH+BCW	32,5cm
BGL	Back Grain Line	½ of BP	16cm	½ of BP	15,2cm	between BGL and Side Seam	13,25cm ½ of BP=16,25

Whereas waist to knee is in its place in M I, it is found 3,25 cm more in M II, 1,75 cm more in M III. It is not a desired finding with regard to the principles of pattern making. What is expected is that it is the same as the body measurement. Because, with the development of a mass-customization model, the apparel industry has the opportunity to provide custom-fitted and garments that are designed for the individual. Securing accurate physical measurements is crucial to achieving successful fit (22).

**3.2. a) The comparison of vertical line formulas and patterns:** The pants pattern grain lines are found with ½ front/back pants width formula (16, 17,21). According to this formula, the results of the compared methods are given in Table 5.

According to the criteria, whereas the front grain line is in its place in all the

three methods, it is determined that the back grain line is in its place in M I and M II, but in M III, it is sliding towards the side seam in the waist line. The value found with formula is 13,25 cm, the expected value is ½ BP 16,25 cm. A difference of 3 cm is found between the two values (Table 5). The figure which is found after the patterns are put on the top of the other on side and inner seam lines of the patterns is given in Figure 2. The back grain line position of M III which slides toward the side seam as much as spotted the space is an undesirable finding on account of pattern making principles. The grain line must be in exactly the middle of the pattern.

**3.2. b) The comparison of side and inner seam patterns:**

According to the criteria, side and inner seams must be put on the top of the other like the grain lines

(16,17,21). In the examination of the patterns by bending them from their grain lines; while the side and inner seams are in their places in M I and M II, the back crutch depth of M III is found 5 cm more (Figure 3).

This figure in M III which is as much as the spotted space does not reflect the correct patterns which are expected from pants patterns.

**3.3. The comparison of darts:** The waist dart appearances of the pants are examined by putting the front and back waist lines on the top of the other. The front dart is closer to the side seam in M I, it is closer to the front middle in M II and M III. The back dart positions are similar in all the three methods. The back dart is single in M I, double in M II and M III. The back waist width of M I is more narrow as much as the second dart cut width than the others (Figure 4).

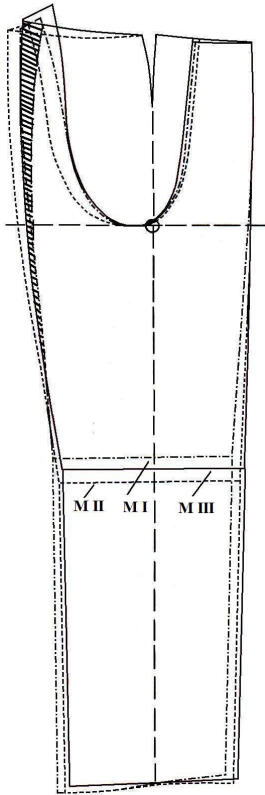


Figure 2. Appearance of grain lines according to methods

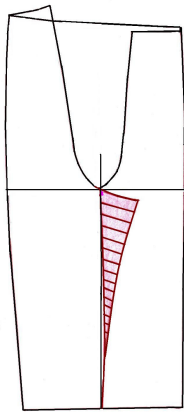


Figure 3. Appearance of M III crutch depth

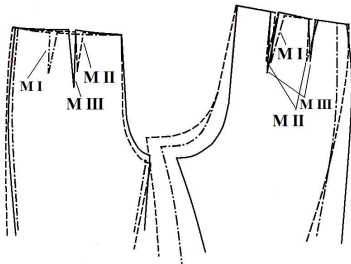


Figure 4. Appearance of darts according to methods

M III has the longest dart length. The darts generally supply the expected results in all the three methods. The usage of dart can vary according to the characteristics of fabric, modal and body. Thus, just the determining of the situation has been made in the comparison.

### 3.4. The comparison of control measurements:

Total crutch depth ( $\Sigma CD$ ) is used as control measurement in all the methods (Figure 5).

In the comparison of  $\Sigma CD$  which is measured in the pattern and the measurement taken from body, some differences are found among the methods (Table 6). According to the findings,  $\Sigma CD$  in M I is shorter than the others.  $\Sigma CD$  in M II and M III is equal to the body measurement. On account of that, the difference of front and back crutch depth (FCD-BCD) is found 0,5 cm shorter in M I. The carriage of the measurement taken from the body in order to create the most proper crutch curve for the hips will

solve the problems especially with the sitting position.

Total crutch width ( $\Sigma CW$ ) is used as the control measurement in M I (Figure 5). However, the other methods are also examined so as to make comparison. According to the results in Table 6,  $\Sigma CW/H$  gives the same values in all of them. In M I and M III,  $\Sigma CW$ s is nearer. M II  $\Sigma CW$  is much more than the others. In preparing pants patterns, this value can be useful for the preteen ages when the development process is fast; because as the physical development starts, the process of getting fat in the hips and waist grows (7).

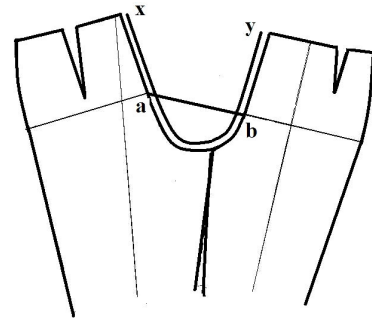


Figure 5.  $\Sigma CW$  ve  $\Sigma CD$  (16)

Table 6. Comparison of control measurements according to methods

Control Measurements		Methods			Body measurement
Code	Description	M I	M II	M III	
$\Sigma CD$	Crutch Depth (x-y)	58,5 cm	60 cm	60 cm	60 cm
FCD	Front Crutch Depth	25,5 cm	26 cm	26 cm	26 cm
BCD	Back Crutch Depth	33 cm	34 cm	34 cm	34 cm
FCD - BCD	Disparity of Front-Back Crutch Dept	7,5 cm	8 cm	8 cm	8 cm
$\Sigma CW$	Total Crutch Width (a-b)	15, 5 cm	19, 5 cm	16, 5 cm	Not measured
CW/H		% 18	% 18	% 18	-
Depth Control: Z		A1-B1	A1-B1	A1-B1	A-B
A-B=   A1-B1		28,65 cm (12,65+16)	29,35 cm (14,15+15,2)	29,5 cm (13,25+16,25)	28-30 cm 26 cm (+2-5)
H		86	88,5	90	86(+4)=90
Z/H		% 33	% 33	% 33	% 30-33

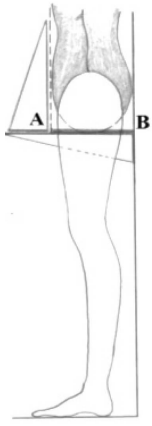


Figure 6.  $Z = |A-B|$

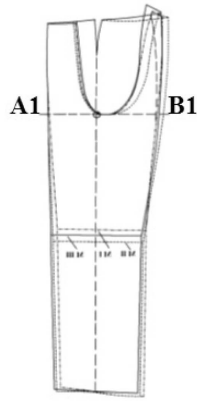


Figure 7.  $Z = |A1-B1|$

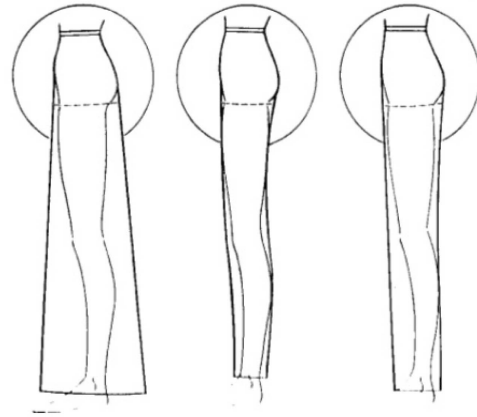


Figure 8. Z depths considering pants forms (16)

The measurement of depth control which is given in Figure 6 is a useful measurement in the calculation of crutch width in the methods of Hillers and System Müller&Sohn (16, 23). However, pattern depth is not used as the control measurement. The results of the research show that it will be useful to use this measurement as depth control measurement in the pants pattern (Figure 7, Table 6).

The depth control can be formulized as  $Z = |AB| = |A1B1|$ . The measurements of  $|AB| = |A1B1|$  vary according to pants patterns (Figure 8). Because the increase of crutch width causes the enlargement of the pants, and on account of that, it causes the shift of the grain line. In all the three methods, Z/H points at the same percentages. Z measurement taken from the body also gives the same result. In the comparison of the methods, the Z depth is the largest in M III, the most narrow in M I (Figure 7).

#### 4. CONCLUSION

According to the findings of the research, knee measurement is not used in M I. Again in M I, the body rise measurement calculated with formula is found with the measurement taken from the body in the other two methods. Compared to the body measurement, the

body rise in M I and waist to knee in M II and M III are found much more. Although the excess in the body rise is accepted with regard to its providing comfort, the excess in waist to knee is an undesirable result. The expected measurement is the equality of the pattern with the body measurements.

In all three methods the additional ease cut is given to waist measurement. Whereas M II and M III provide the essential additions for hips, M I does not. Front grain line is found in its place in all three methods. It is determined that back grain line is in its place in M I and M II, it slides towards side seam between waist and hips in M III. The expected position is that grain lines pass from exactly the middle of the pattern. In the control of side and inner seam whereas M I and M II gives the expected result, the correct pattern is not found in M III. The darts generally provide the expected measurements in all three methods.  $\Sigma CD$  in M I is shorter than the others.  $\Sigma CD$  in M II and M III is equal to the body measurement,  $\Sigma CW$  in M II is near to the each other.  $\Sigma CW$  in M I and M III is nearer, it is much more in M II than the others. Depth control measurement must be used in the control of pants pattern depth. In the comparison of the methods, the Z depth is found largest in M III, the most narrow in M I.

When the positive and negative findings are examined; compared to the negative aspects of M I and M III, the only negative aspect of M II is that the waist to knee measurement is much more than the measurement taken from the body. This measurement is an ignorable one in the study of basic pants patterns. What provides the criteria determined in the research most is the pattern prepared with M II.

The physical development stages of children are not increasing in proportion to ages. Therefore, child cloth patterns must be flexible to include large groups on account of measurement. Every firm prepares patterns according to their customers' body measurements and characteristics. However, the basic pants patterns which are prepared with M II will give better results on account of that the additions to waist and hips provide the expected amount (Table 2), it addresses different measurements in the same body and the control measurements are found near to the body measurements.

The basic characteristic in preparing cloth pattern is its accordance with body. Thus, the accordance of the pants prepared with the methods to body must be examined in another research topic. More reliable patterns can be prepared with a new method which combines the positive aspects of all the three methods.

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