

\$Q \$QDO\VLV RI D 1HZ 'LDJQRVWLF 7HVW IRU &
3ODVPD /HSWLQ /HYHO

+DUXQ 5HVLW \$VDQDOD (UPDQ 'ROGVEMQHUV 7XUDQ
'HSDUPHQW RI 3HGLDWULF 6XUJHU\ \$FÖEDGHP +RVSLWDO .D\|VHUL 7XUNH\
'HSDUPHQW RI 3HGLDWULF 6XUJHU\ +DUUDQ 8QLYHUVLV\ 0HGLFDO 6FKRRO ùDQOÖXUID 7XUNH\
'HSDUPHQW RI 3HGLDWULF 6XUJHU\ (UFL\|HV 8QLYHUVLV\ 0HGLFDO 6FKRRO .D\|VHUL 7XUNH\
&RUUHVSRRQLQXD\|WKRUPDQ 'RUWHUOHU 'HSDUWPHQW RI 3HGLDWULF 6XUJHU\ +DUUDQ 8QLYHUVLV\
(PDLO GRUWHUOHU#KRWPDLO FRP
5HFHLYHG 0DWH \$FFHSWHG\$DXWH 3XEOLFDFWLRQRSGDPEHU
&RSULJKW \$|DQJLO +5 HW DO 7KLV LV DQ RSHQ DFFHVV DUWLFQH GLVWULEXWHG XQG HU WKH WHUPV R
XVH GLVWULEXWLRQ DQG UHSURGXFWRQ LQ DQ\ PHGLXP SURYLGHG WKH RULJLQDO DXWKRU DQG VRXU

\$EVWUDFW

\$LP,Q WKH GLDJQRVLV RI DFXWH DSSHQGLFLWLW WKH PRVW IUHTXHQWO\ DSSOLH
:%& DQG VHUXP & UHDFWLYH SURWHLQ &53 ,Q UHFHQW \HUV LW KDV EHHQ WK
KDV EHHQ SURYHQ WR EH UDLVHG LQ DFXWH LQIODPPDWLRQ FRXOG EH XVHG GLDJ
,Q WKLV VWXG\ ZH DLPHG WR GHWHUPLQH WKH UHODWLRQVKLS EHWZHHQ :%& &
DFXWH DSSHQGLFLWLW DQG WR GHILQH WKH UROH RI OHSWLQ LQ WKH PHFKDQLVP
IUHTXHQWO\ REVHUYHG \|PSWRP

0DWHULDQV DQGHFWKFRG FRPSULVHG SDWLHQWV GLDJQRVHG ZLWK DFXWH DSS
6XUJHU\ 'HSDUWPHQW DQG D FRWURO JURXS RI DJH PDWFKHG SDWLHQWV %OR
ERWK JURXS DQG WKH OHYHOV RI :%& &53 DQG OHSWLQ ZHUH PHDVXUHG %RG
ILQGLQJV ZHUH FRPSDUHG

5HVXOV WKH \$\$ JURXS WKH PHGLDQ OHSWLQ YDOXH ZDV PHDVXUHG DV Q
SHULRSHUDWLYHO\ DQG QJ PO GD\| SRVWRSHUDWLYHO\ 7KH OHSWLQ YDOX
VWDWLWVLFDOO\ VLJQLILFDQW GLIIHUHQFH ZDV IRXQG EHWZHHQ WKH WZR JUR
SHULRSHUDWLYH OHSWLQ YDOXHV QGD\ OHSWLQ SRVWRSHUDWLYH WKH \$\$ JURXS ZHUH
VLJQLILFDQWO\ ORZHU WKDQ WKRVH RI WKH FRWURO JURXS S

&RQFOXVLRQV DVHV RI VXSHFWHG DFXWH DSSHQGLFLWLW OHSWLQ FDQ EH D XV
OHYHOV LQFUHDVH GXULQJ WKH HDUO\ VWDJHV RI LQIODPPDWLRQ

WKRUPDQ 'RUWHUOHU 'HSDUWPHQW RI 3HGLDWULF 6XUJHU\ +DUUDQ 8QLYHUVLV
,QWURGXFWRQ
\$FXWH DSSHQGLFLWLW LQ FKLOGKRRG UHTXLUHV HPHUJHQF\ VXUJHU\
\$OWKRXXK WKH SDWLHQWV KLWWRU\ SK\|VLFDO H[DPLQDWLRQ DQG ODERUDWRU
WHVWV DUH XVHG LQGGLDFWLRQV LQ 28 X 70 X 70 W\|xGLYFXVP

H \$\$ JURXS KDG D PHDQ DJH RI \H DUV UDQJH \H DUV DQG
LQFOXGHG SDWLHQWV FRQVLGHUHG WR KDYH DFXWH DSSHQGLFLWLWV DFFRUGLQJ
WKHLU PHGLFDO KLVWRU\ DV ZHOO DV WR FOLQLFDO DQG XOWUDVRQRJUDSK\ 86
H[DPLQDWLRQV DQG ZKRO\HURGHUFRFRSLEDUO\
GXULQJ VXUJHU\ 3DWLHQWV ZHUH H[FOXGHG IURP WKLV JURXS LI WKH\ ZHUH
FRQVLGHUHG WR KDYH DFXWH DSSHQGLFLWLWV FOLQLFDOO\ DQG RQ 86* EXW ZHU
QRW}UHG VXUJHU\ RU LI WKH\ ZHUH IRXQG WR KDYH DQRWKHU
LQ~DPPGLVHDVH DV ZHOO DV DSSHQGLFLWLWV

H FRQWURO JURXS KDG D PHDQ DJH RI \H DUV UDQJH \H DUV
DQG LQFOXGHG SDWLHQWV ZKR SUHVHQWHG DW WKH 3HGLDWULF 6XUJHU\ 3RO\FOR
FRPSODLQLQJ RI FRQWLSDWLQDPRDWRZKR GLVSOD\HG QR
GLVHDVH RQ SK\VLFDO H[DPLQDWLRQ RU FOLQLFDOO\ DW WKH WLPH RI HQUROOP
LQWR WKH VWXG\ RU LQ WKH DQDPQHVLV

0HWKRG

VWDWL VWLFD)FQW MRJQL}SDQWUHZDFH
GHWHUPLQHG %0, EHWZHHQ WKRVH ZLWK D SHUIRUDWHG DSSHQGL[DQG WKRVH
ZLWKRXW S! 7DEOH

H :%& YDOXH RI WKH SDWLHQWV ZHUH PHDVXUHG DV s
PP SUHRSHUDWLYHO\ s PP

3HUIRUDWHG DSSHQGLRQ SHUIRUDWHG DSSHQGL[
 Q Q PHGLDQ PLQ PD[S
 PHGLDQ PLQ PD[

&53	3UHRSHUDWLYH	±	±		
	3HULRSHUDWLYH	±	±		
	3RVWRSHUDWLYH 'D\	±	±		
/HSWLQ	3UHRSHUDWLYH	±	±	— Af	±

'LVFXVVLQR

:%& DQG &53 DUH ODERUDWRU\ WHVWV WKDW DUH IUHTXHQWO\ DSSOLHG WR
FKLOGUHQ VXVSHFWHG RI KDYLQJ DFXWH DSSHQGLFLWLVLV :%& ZKLFK LQFUHDVHV
LQ WKH HDUO\ VWDJHV RI WKH GLVHDSV DQG EHIRUH SHUIRUDWLRQ RFFXUV KDV
EHHQ UHSRUWHG WR VKRZ DQ\ VWDWLVLWLFDOO\

&LWDWISRDQJLO +5 'RUWUOHU 0(7XUDQ & \$Q \$QDO\VLV RI D 1HZ 'LDJQRVWLF 7HVW
/HYHO - *D VWURLQWHVW 'LLJ 6\VV ;

3DJH RI

0HDQV 57 3DWKRJHQHVLV RI WKH DQERLDONIL 6%URQLF&GULNBDWHYHDSURWHLQ ,QV
F\WRNLQH PHGLDWHG DQHPLD 6WHP &HOOV *XDOLOOR 2 (LUDV 6 /DJR) 'L«JXH] & &D
&O\QH % 2OVKDNH@ U@DFWLYH SURWHLQ -VHUP OHSWLQ FRQFHQWUDWLRQV LQGXI
LQ~DPPD\WLRQFLHQFHV
%DXPDQQ + *DXOGLHFXWH SKDVH UHVSQRVHDYRXPQRQ\ (OHPLVRJOX . .UDQG 2 .L]LQ
7RGD\ a OHSWLQ OHYHOV LQ UDWV ZLWK SDQFUHDWL